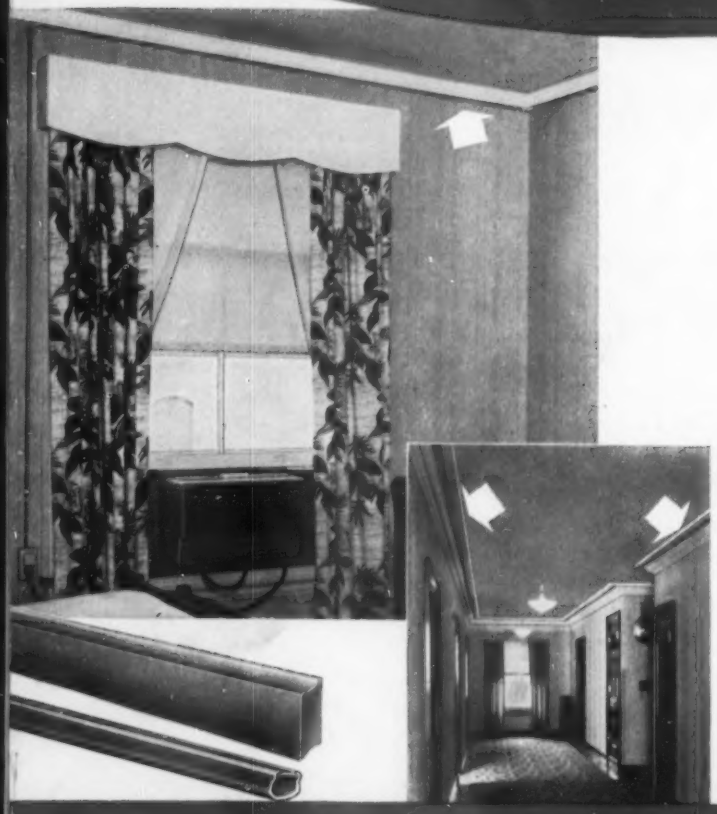
ELECTRICAL SOUTH

Serving the 18 Southern and Southwestern States

Cost factors in textile mill power distribution—page 22

APRIL, 1956

WIREMOLD
is the
Modern Way to Wire
for room air conditioners



Big rewiring business for you!

There's Big Business for you in electrical wiring for room air conditioners in hotels, office buildings and apartment houses.

Wiremold is the answer to better profits through quicker, easier wiring installations. Surface installed Wiremold eliminates "behind the wall" problems caused by hidden obstructions in walls and flooring . . . it saves you labor cost and losses through inaccurate estimating. Just measure from point to point and pre-plan your wiring jobs with Wiremold.

Additional wiring installations, necessary to accommodate room air conditioners at the Elton Hotel in Waterbury, Connecticut, presented no problem to electrical engineers. Wiremold 3000 raceway was neatly tailored adjacent to the corridor moldings, and Wiremold 200 taking off from 3000, carried power into each room. The entire installation was completed in a minimum of time, with no inconvenience to guests. No muss . . . no fuss.

For further information write to Dept. K-4

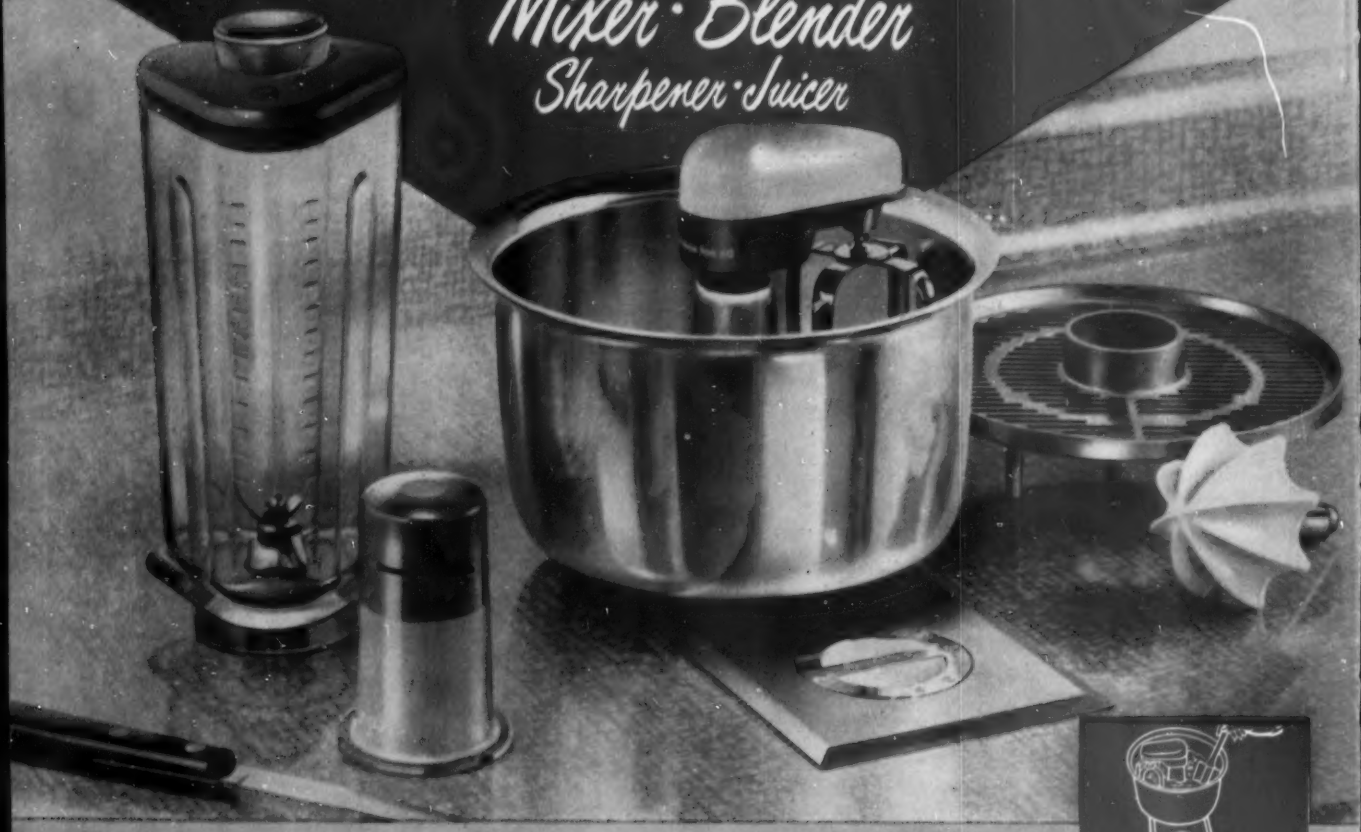
The WIREMOLD Company
Hartford 10, Connecticut

Represented by
H. C. Biglin Co., Inc.
177 Harris St., N.W.
Atlanta 3, Georgia

Wynne Snoots
2nd Unit Santa Fe Bldg.
Dallas 2, Texas

NuTone "IN·BUILT"

Mixer · Blender
Sharpener · Juicer



Most Exciting Kitchen Appliance in 20 Years!

EASY TO INSTALL IN ANY KITCHEN COUNTER TOP

No need to waste valuable cabinet space for storage of separate motor units for many other kitchen appliances. NuTone's single, powerful "In-Built" Food Center does everything — it's recessed completely out of sight, leaving the kitchen counter top smooth and tidy.

The NuTone "In-Built" can be installed over a drawer, or cabinet fillers, or "dead" corners, above a door type cabinet and in other spaces.

U. S. & FOREIGN PATENTS PENDING

IT'S A LARGE MIXER — with a motor driven bowl — full 3½ quart size. Precision fit of single beater mixes better than 2 or 3 beaters.

IT'S A FOOD BLENDER — with 6 speeds, instead of 1 or 2. Stainless steel blades, sealed in for safety. Light weight plastic container.

IT'S A KNIFE SHARPENER — with flexible sharpening discs. No solid stone to destroy knife temper. Removable cap catches grit.

IT'S A FRUIT JUICER — holds enough juice to fill ten 4-ounce glasses.

HERE ARE MORE NUTONE "IN-BUILTS" FOR YOUR HOMES!

EXHAUST FANS
FOR FRESH CLEAN AIR IN KITCHENS AND BATHROOMS

RANGE HOODS
FOR GOOD VENTILATION AND SPARKLING BEAUTY

DOOR CHIMES
"CHEERFUL EARFUL" AT THE DOOR IN TUNE WITH MODERN TREND

CEILING HEATERS
THE WORLD'S SAFEST HEATERS FOR "TOASTY-WARM" BATHROOMS

FREE SEND FOR CATALOGS

NUTONE SOUTHWEST DIVISION
1303 Dragon St., Dallas 7, Texas

NUTONE EASTERN DIVISION, 4003 Empire State Bldg., New York 1, N. Y.

Southwire means service

"You helped us out of a tight spot"

Says Earl L. Phillips, *Manager*
Capital Electric Power Association
Clinton, Mississippi

This Mississippi REA needed conductor urgently! A call to a Southwire representative at 2 o'clock on Sunday brought action. 15,000 pounds of No. 2 three-strand bare copper was rolling to Clinton Monday morning—another case where Southwire service saved the day for a valued customer!

"We have never experienced any service as prompt as this," says Earl L. Phillips, manager, "and we want to commend you for this and other excellent deliveries."

Here again is where flexible manufacturing schedules, a fast fleet of trucks and individual attention to orders prove what Southwire means.

When you need wire . . . order Southwire . . . and enjoy Southwire service.

Southwire Company

Telephone: TErrace 2-6311 • Carrollton, Georgia

SOUTHWIRE PRODUCTS

- Bare and Weatherproof Copper and Aluminum Line Wire
- Neoprene Copper, Aluminum and Triplex
- Polyethylene Copper, Aluminum and Triplex
- Copperweld® Conductors
- Copper and Aluminum Building Wire
- ACSR and All Aluminum Cable
- Steel Guy Strand and Static Wire
- Aluminum Alloy Wire
- Cable Accessories

ELECTRICAL SOUTH is published monthly at 116 E. Crawford Street, Dalton, Georgia, by W. R. C. Smith Publishing Company. Executive and Editorial Offices: 806 Peachtree Street, N. E. Atlanta 8, Georgia. Second-class mail privileges authorized at Dalton, Ga. Subscription Rates: United States and Possessions, $1.00 per year; Canada and Foreign Countries, $10.00 per year.

Volume 36 Number 4

Workman's Pride . . . Back of Every L & P Light Fixture

Workmen at Light and Power Utilities Corp. are proud—proud that the finest materials, the keenest know-how, and the highest standards of quality and performance are part of every L & P fluorescent lighting fixture they make.

We, in turn, are proud of our L & P craftsmen. For they, after all, are your surest guarantee of the efficiency, dependability and economy you have come to expect from L & P fixtures.

Distributed by Wholesale Dealers Only

WRITE TODAY FOR CATALOG AND PRICES

There's an L&P *Representative Near YOU!*

For further information and prices on L & P fluorescent fixtures—standard or "custom-made"—check the following list, and phone or write the L & P representative nearest you:

Walter J. Huemmer
Dallas Transfer & Terminal Warehouse
Dallas 2, Texas

E. B. Thornton
2829 Sunset Blvd.
Houston, Texas

V. E. Stephens
3523 Dutton Drive
Dallas, Texas

N. B. Nichols
2509 Bishop
Little Rock, Ark.

Craig-Owen
306 E. 11th St.
Chattanooga, Tenn.

C. V. Hammon
4400 S. High St.
Oklahoma City, Okla.

Irving Milow
415 Clover St.
Rochester, N. Y.

C. K. Ramond
1021 Carondelet Bldg.
New Orleans, La.

Tom Melady
1021 Carondelet Bldg.
New Orleans, La.

Hal P. Beard
Light & Power Utilities Corp.
Memphis, Tenn.

M. B. Mendenhall
4506 Country Club Blvd.
Sioux City, Iowa

W. J. Milner
148 Walker S. W.
Atlanta, Ga.
(Also: St. Simons Island, Ga.)

J. Louis Weyhing
1914 Rutherford Ave.
Louisville, Ky.

John Irvin
Box 816
Nashville, Tenn.

Dave Otey
2214 Wakefield Road,
Richmond, Va.

Nobel Arnold
148 Walker
Atlanta, Ga.

Light & Power Utilities Corp.
1035 Firestone Blvd.
Memphis, Tenn.

ELECTRICAL SOUTH

SERVING THE 18 SOUTHERN AND SOUTHWESTERN STATES

April, 1956 — Vol. 36—No. 4

CARL W. EVANS, *Editor*
DOROTHY H. DUNN, *Assistant Editor*
BARON CREAGER, *Southwestern Editor*
(7713 *Inwood Road, Dallas, 9, Tex.*)
T. W. McALLISTER, *Vice-Pres., Editorial Director*

FIELD EDITORS

BILL CROWELL Raleigh, N. C.	GRIER LOWRY Kansas City, Mo.
S. W. ELLIS Little Rock, Ark.	B. MILLER Washington, D. C.
WENDELL O. GIVENS Birmingham, Ala.	HAL M. NEWSOME Miami, Florida
L. H. HOUCK Jefferson City, Mo.	WARNER OGDEN Knoxville, Tenn.
RICHARD LANE Memphis, Tenn.	W. W. WESTBROOK New Orleans, La.
ED LONDON Jackson, Miss.	C. E. WRIGHT Jacksonville, Fla.

•

FRANK P. BELL, *Business Manager*
J. J. FELTON, JR., *Advertising Manager*
J. A. MOODY, *Production Manager*
REDFERN H. HOLLINS, *Director Market Research*

Business Representatives

New York:
GERARD TEASDALE, 78 Manhattan Ave., New York, N. Y. Tel. University 4-2087

Cleveland:
W. G. SHEEHAN, 17021 Amber Dr., Cleveland 11, Ohio. Tel. Winton 1-1306

Chicago:
ROBERT A. BLUM, 333 No. Michigan Ave., Chicago 1, Ill. Tel. Central 6-6964

Los Angeles:
L. B. CHAPPELL, 810 So. Robertson Blvd., Los Angeles 35, Calif. Tel. Crestview 4-5151

Charlotte:
W. C. RUTLAND, P. O. Box 102, Gastonia, N. C. Tel. University 7-7995

Dallas:
BARON CREAGER, 7713 Inwood Road, Dallas 9, Texas. Tel. Fleetwood 7-2937

Miami:
RAY RICKLES, Chamber of Commerce, Miami, Fla. Tel. Miami 9-1495

•

ANNUAL SUBSCRIPTION—$1.00
FOREIGN—$10.00

•

Editorial and Business Offices
Tel. Atwood 4462
806 Peachtree Street, N. E.
Atlanta 8, Georgia

In This Issue

Seaquarium wiring goes underground	18
Wiring for a hospital extension	20
Tools inventory system reduces job expense	21
Cost factors in textile mill power distribution	22
Code interpretations clarify wiring rules	24
Wiring conference reviews new program	25
Successful home lighting promotion	26
Effective cooling demonstration	28
Mediation board settles contract disputes	32
Case histories in labor relations	34
Code questions for industrial electricians	40
Electrical South Data Sheets	48 & 65
Utility engineers' forum	53
Substation grounding practices	53
Controlled tension wire stringing	57
Conductor weight comparisons—3-phase vs 1-phase	58

Economic comment	4
Association directory	8
Know the law	27
Industry news	72
Dates ahead	81
News about people	84
Technical books	88
Bulletins and booklets	90
New products parade	92

Published Monthly by
W. R. C. SMITH PUBLISHING COMPANY
Dalton and Atlanta, Ga.

•

W. J. ROOKE ——— *Chairman of the Board*
RICHARD P. SMITH ——— *President and Treasurer*
T. W. McALLISTER ——— *First Vice-President*
E. W. O'BRIEN ——— *Vice-President*
A. E. C. SMITH ——— *Vice-President*
JOHN C. COOK ——— *Vice-President*
A. F. ROBERTS ——— *Secretary*
SEBA J. JONES ——— *Asst. Secretary and Treasurer*

•

Publishers Also of
SOUTHERN POWER & INDUSTRY
SOUTHERN HARDWARE — TEXTILE INDUSTRIES
SOUTHERN AUTOMOTIVE JOURNAL
SOUTHERN BUILDING SUPPLIES

Copyright 1956, W. R. C. Smith Publishing Co., Atlanta, Georgia

Economic comment

by J. Whitney Bunting, Ph.D.

Statistics, people, markets

Practically everyone is thoroughly conversant with the trends of population during recent years. Such facts have been popularized primarily through the pressure for increased school facilities to care for the bumper crops of elementary and high school age children. Youth is fairly bursting the seams of our educational institutions, both public and private. Yet many people fail to realize the full implications of this surge to our economy in ten or fifteen years time.

What will happen when present school age children join the labor market, begin to raise families and establish homes, or become prospective customers for the food growers and appliance manufacturers of this nation?

These are all pertinent questions and should be carefully weighed and considered by the American businessman of today. History has shown us that huge masses of people within a nation can depress an economy if that same economy is not geared to care properly for the people.

One hears much of the famine starvation and destitution of the peoples of India, China and other regions of intense population concentration. In fact, the old Malthusian Law of economics once foretold that population could outrun the means of subsistence.

As learned a man as Benjamin Franklin once wrote an article outlining a similar end for the people of America if they continued to multiply as they were in early colonial times. Yet such a catastrophe has never come to pass.

The answer, of course, is that technological advance has more than kept pace with population growth so that today, in spite of millions more people on the face of the earth, the world is a far better place to live, and people have more and better goods for a continually increasing standard of living. Thus, population in the past has tended to promote inventive genius, farm productivity and industrial technology to such an extent that the fears of old philosophers have faded into insignificance.

Automation the answer

Industry's answer to the present population growth is tied to a new word, "automation." This is a new system of production based more upon mechanics and electronics than upon the old style of industrial manpower. Control of production will be largely automatic thus causing an increase in the quantity and variety of the products available on the market. Electronics will report job progress and will give continual inspections for the maintenance of quality. The more unpleasant tasks of the industrial field may be completely removed and people can be freed for more pleasant and rewarding tasks.

But what will all of this mean? In order to maintain our continually improving standard of living, America must increase its gross national product by 40 per cent in the next decade. This compares with an increase of some 37 per cent during the past ten years.

During 1956 the nation may have a gross national product of $400 billion, the first time in history that this high plateau of productivity has ever been reached. Undoubtedly, it has not been achieved by virtue of increased work hours. In fact, over the years the number of work hours per man per week have been reduced until the forty hour work week is now considered standard for most industrial employees.

Nor is it because a heavier population group has entered the work force. With approximately 65 million persons gainfully employed during the past year, there has been only apout a 13 per cent increase during the past ten years Looking ahead for the next ten years it is possible to expect only an additional work force of some 14 per cent upon which to base the expected 40 per cent added productivity.

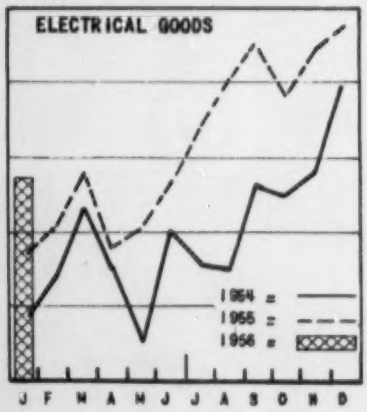
The key to the problem is the fact that all phases of economic life have become increasingly mechanized during the era since World War II. And the hope for the future well being of the American people lies in the continuance of the "machine-age" pattern.

Implications for labor

There is much fear that this new technology will have broad repercussions upon the job security of labor. On the basis of studies, however, such should not be the case. Industrial workers should benefit from properly integrated automation to the extent that shorter work hours may be encountered, greater pay may be in prospect, more leisure time for personal and family development may be obtained, and in fact a fuller and more satisfactory living experience can be encountered.

There is only one other way to successfully assimilate increased population into our economy unless the nation turns to automation. That way would be to work longer hours to produce the foodstuff and materials needed for consumption. In effect this would mean a step backward from the present standard of living level. Certainly no one would advocate such a procedure.

Wholesalers' sales



Dr. Bunting is a well-known economist and educator having special knowledge of the South.

Greater public safety...at new low cost to you

Hubbard's new Glo-Guard Guy Protector

Now you can get added protection for the public at a new low cost . . . with Hubbard's *Glo-Guard* Guy Protector. *Glo-Guard* has the added feature of luminous areas that reflect brightly in headlight glare. And the *Glo-Guard* is easily visible on dimly lighted streets or poorly lighted areas to warn pedestrians of dangerous projections.

Hubbard's new *Glo-Guard* Guy Protector is available in two lengths, 7 feet (Stock No. 718) and 8 feet (Stock No. 818). Attachment holes and clips are spaced for mounting on guy wires, rods or clamps at any height. It is formed from Cor-ten steel for long life and high strength.

Glo-Guard is the latest addition to Hubbard's complete line of Guy Protectors. Also available is Hubbard's *Loxfast* Guy Protector. With only one bolt to tighten, the *Loxfast* is designed for fast installation and long years of service. *Loxfast* is available in 7 foot lengths (Stock No. 7657 Light and Stock No. 27657 Heavy) and 8 foot lengths (Stock No. 7658 Light and Stock No. 27658 Heavy).

Another Protector, popular with utilities, is Hubbard's *Half Round* Guy Protector. Edges of the *Half Round* are turned in for greater rigidity and safety. The *Half Round* is also available in two lengths, 7 feet (Stock No. 7557) and 8 feet (Stock Number 7558 for two bolts and Stock No. 7559 for three bolts).

For information on Hubbard's complete line of Guy Protectors, please contact your nearest distributor or Hubbard and Company, 6301 Butler Street, Pittsburgh 1, Pa.

HUBBARD AND COMPANY

Pittsburgh 1, Pa.
Chicago 50, Ill.
Oakland 8, Cal.

For more economical operation

Modernize electric distribution systems with SORGEL air-cooled transformers or substations

INCREASE FEEDER CAPACITY AND EFFICIENCY BY TRANSMITTING ELECTRIC POWER AT HIGHER VOLTAGES TO LOAD CENTERS

The most practical type transformers to step down voltages at load centers are SORGEL air-cooled dry-type transformers. They can be installed in almost any convenient place inside of buildings, without fire-proof vaults or other enclosures. SORGEL transformers are of the highest quality, and require little or no maintenance. No liquid to check nor replenish; small and compact; easy and convenient to install; economical operation.

Increased efficiency—Because SORGEL transformers can be installed close to load centers, the result is shorter feeders, better voltage regulation, more efficient distribution, and lower wiring cost.

Quiet operation — The sound level of SORGEL transformers is well below the established standards. This outstanding feature is appreciated where low sound levels are an important factor. For that reason they are particularly adaptable for indoor installations close to load centers.

Easy installation—Attached wall brackets, with slots for bolts, or floor mounting base. No separate mounting brackets nor junction boxes to make or buy.

A perfect partner for substations—SORGEL transformers can also be incorporated in substations, complete with primary and secondary switchgear. They are procurable with any make of switchgear, and from any substation manufacturer.

Complete Line

¼ Kva to 2500 Kva, single phase.
1 Kva to 3000 Kva, 3-phase, 2-phase and phase changing. All standard voltages, such as 120, 208, 240, 480, 600, 2400, 4160, 4800, 7200, 13,200, up to 15,000 volts, and any intermediate or special lower voltages.

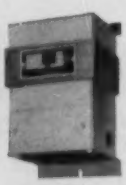
Stock carried by jobbers in the following cities:

New York, N. Y.
Buffalo, N. Y.
Roxbury, Mass.
High Point, N. C.
Raleigh, N. C.
Philadelphia, Pa.
Cincinnati, Ohio
Cleveland, Ohio
Chicago, Ill.
Rock Island, Ill.
Rockford, Ill.
Richmond, Ind.
Louisville, Ky.
Cedar Rapids, Iowa
Davenport, Iowa
Omaha, Neb.
Beaumont, Texas
Los Angeles, Calif.

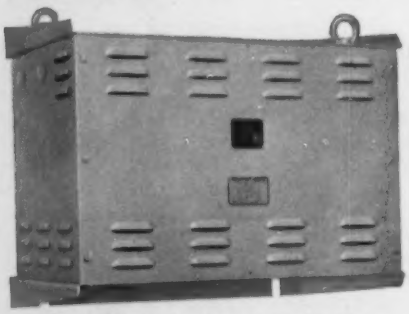
Consult the classified section of your phone directory or write to factory

Also special transformers and saturable reactors

Tested and approved by Underwriters' Laboratories under the Re-examination Service



¼ Kva single phase 480/240 to 240/120 volts



15 to 50 Kva 3-phase. Wall mounting type

100 Kva single phase

SORGEL ELECTRIC CO. 835 West National Avenue, Milwaukee 4, Wis.

Sales Engineers in Principal Cities

here's why GrateLite* is great!

eye comfort you can measure
300 F.C. with only
1.11 C.P./Sq. In. Brightness

and here are the figures to prove it . . .

Foot-Candles, Efficiencies, Brightness Readings

In our own showrooms we've installed a 15' x 16' GrateLite Ceiling. By switching on various lamp arrangements we can deliver from 28 to 300 foot-candles 7' 9" below the GrateLites. Measurements at right give GrateLite efficiency figures and brightness readings at 30° and 45° below the ceiling.

THESE FIGURES PROVE GRATELITE in a class by itself for modern high intensities, safely within comfort ranges plus a high degree of diffusion.

AREA: *15' x 16' (240 Sq. Ft.)*
GRATELITES: *Suspended 18" below ceiling*
FT.-CANDLES: *Taken 7' 9" below GrateLite*
BRIGHTNESS READINGS: *Taken with "Spectra" Electronic Meter*
LUMINAIRES: *Guth M-5385/TO*
ROOM COLORS: *3 walls—light green—60% R. F. Floor—15% R. F.*

Item No.	No. of 8" Lamps & M. A.	Total Lamp Wtg.	Foot-Candles With Gratelites	Foot-Candles Less Less.	EFF. With & Without	Brightness At 30°* F. L.*	Brightness At 30°* C. P. I. Per Sq. In.	Brightness At 45°* F. L.*	Brightness At 45°* C. P. I. Per Sq. In.
1	8 @ 200	400W	28	30	70%	50	0.11	50	0.11
2	16 @ 200	800W	50	70	71%	100	0.22	110	0.24
3	24 @ 200	1200W	85	100	70%	130	0.29	140	0.31
4	24 @ 430	1800W	135	170	79%	185	0.43	210	0.46
5	8 @ 200 24 @ 430	2200W	163	200	82%	230	0.51	250	0.55
6	16 @ 200 24 @ 430	2800W	188	230	82%	290	0.64	325	0.72
7	24 @ 200 24 @ 430	3000W	210	260	81%	330	0.71	350	0.77
8	48 @ 430	3600W	240	310	77%	300	0.84	520	1.15
9	8 @ 200 48 @ 430	4000W	285	340	79%	410	0.91	570	1.26
10	16 @ 200 48 @ 430	4400W	265	300	79%	420	1.04	620	1.37
11	24 @ 200 48 @ 430	4800W	300	390	77%	500	1.11	650	1.43

*F. L.—Foot Lamberts †C. P.—Candlepower *U. S. & Can. Pats. Pend. Trademark Registered

It's all in the sight-saving cubes—and only GrateLite has them!

Send for free booklet **"The GrateLite Story"** *Also* **"Glare Factors"** *and* **"Visual Comfort Indexes".**

Guth — **EDWIN F. GUTH CO.** • ST. LOUIS 3, MO.

Leaders in Lighting since 1902

ELECTRICAL ASSOCIATION DIRECTORY FOR THE SOUTH AND SOUTHWEST

Electric Institute of Washington. William G. Hills, Managing Director, 10th and E Sts., Washington, D. C.

Electrical Clearing House of Louisville, Inc. W. D. Roach, Secretary-Treasurer, 731 W. Ormsby Ave., Louisville 3, Ky.

Electrical Association of New Orleans. E. H. Mowen, Secretary, 921 Union St., New Orleans, La.

Peninsula Electrical Association. J. Russell Hopkins, Secretary, c/o Central Electrical Supply Co., Salisbury, Md.

The Electric Association of Kansas City. John S. McDermott, Executive Manager, Merchandise Mart Bldg., Kansas City 8, Mo.

St. Louis Electrical Board of Trade. Carl H. Christine, Secretary-Manager, 1221 Locust St., St. Louis 3, Mo.

Electric League of Chattanooga. Paul J. McMillian, Secretary, Sixth and Market Sts., Chattanooga 2, Tenn.

Electrical League of Norfolk. C. R. Hegamyer, Secretary-Treasurer, P. O. Box 605, Norfolk 1, Va.

Electrical Association of Richmond. C. F. Bennett, Executive Secretary, 205 West Grace St., Richmond 20, Va.

The Electric League of Charleston. Guilford C. Smith, Secretary-Treasurer, c/o Appalachian Electric Power Co., P. O. Box 1986, Charleston 27, W. Va.

Central West Virginia Electrical League, Inc. J. R. Waters, Secretary, P. O. Box 1392, Fairmont, W. Va.

UTILITIES

Southeastern Electric Exchange. John W. Talley, Managing Director, 303 Haas-Howell Bldg., Atlanta, Ga.

The Maryland Utilities Association. Robert L. Smith, Secretary, Frederick, Md.

Oklahoma Utilities Association. Kate A. Niblack, Secretary, Suite 2415, Oklahoma Biltmore Hotel, Oklahoma City 2, Okla.

Public Utilities Association of the Virginias. R. W. McKinnon, Executive Secretary, 5 Franklin Rd., SW, Roanoke 11, Va.

WHOLESALERS

Southeastern Electrical Wholesalers Association. M. L. Tice, Executive Vice-President, P. O. Box 176, Ben Hill, Ga.

National Association of Electrical Distributors. Arthur W. Hooper, Executive Director, 290 Madison Ave., New York 17, N. Y.

REPRESENTATIVES

Southeastern Electrical Manufacturers Representatives Club. Frank P. Bell, Secretary-Treasurer, 806 Peachtree St., NW., Atlanta 3, Ga.

Electrical Manufacturers Representatives Association, Inc. Alfred L. Daniels, Secretary, 1622 Mathieson Bldg., Baltimore 2, Md.

Electrical Manufacturers' Representatives of Virginia, Inc. C. F. Bennett, Secretary, 205 West Grace St., Richmond 20, Va.

CONTRACTORS

Florida Association of Electrical Contractors. L. L. Dick, State Manager, 620 Stovall Professional Bldg., Tampa 2, Fla.

Association of Independent Electrical Contractors. R. E. Naumann, Secretary, 704 Frenchmen St., New Orleans 16, La.

Electrical Contractors Association of Maryland. Charles L. Greer Secretary-Treasurer, 404 North High St., Baltimore, Md.

National Electrical Contractors Association. Clint J. Harder, Secretary-Treasurer, 1200 18th St., NW, Washington 6, D. C.

NECA, Birmingham Chapter. Ernest W. Weir, Manager, P. O. Box 1781, Birmingham, Ala.

NECA, Gulf Coast Chapter. Frank M. Hawkins, Manager, 402 St. Michael St., Box 1003, Mobile, Ala.

NECA, Central Alabama Chapter. C. A. Dart, Manager, 212 Hunter Lane, Montgomery, Ala.

NECA, Arkansas Chapter. Carl E. Harris, manager, 202 National Old Line Bldg., Little Rock, Ark.

NECA, Washington, D. C. Chapter. Harry W. Kellems, Manager, 910 17th St., NW, Washington 6, D. C.

NECA, North Florida Chapter. W. S. Binckley, Manager, P. O. Box 3172, Jacksonville, Fla.

NECA, South Florida Chapter. Charles J. Powers, Manager, 2607 Flagler St., Miami 35, Fla.

NECA, Atlanta Chapter. George L. Paterson, Manager, 4234-5 Atlanta National Bldg., 50 Whitehall St., Atlanta, Ga.

NECA, Southeastern Industrial Chapter. K. D. White, 946 W. Peachtree St., NW, Atlanta, Ga.

NECA, South Georgia Chapter. R. A. Kobs, Manager, 3208 Hamilton Rd., Columbus, Ga.

NECA, Kansas Chapter. Charles W. Paige, Manager, 416 Central Bldg., Topeka, Kan.

NECA, Central Kentucky Chapter. Daniel N. Brock, Acting Manager, 706 Bank of Commerce Bldg., Lexington, Ky.

NECA, Louisville Chapter. J. C. Snyder, Manager, P. O. Box 1685, Louisville 1, Ky.

NECA, Southwest Louisiana Chapter. Herman T. Vallery, P. O. Box 5584, Drew Station, Lake Charles, La.

NECA, South Louisiana Chapter. Rudolph Viemer, Jr., Manager, 831 St. Peter St., New Orleans 16, La.

NECA, North Louisiana Chapter. F. J. Evans, Manager, 753 Dalzell St., P. O. Box 1210, Shreveport, La.

NECA, Maryland Chapter. Robert L. Higgins, Manager, American National Bldg., Room 305, 204 North Liberty St., Baltimore 1, Md.

NECA, Central Mississippi Chapter. John C. Sullivan, Manager, 970 Milner Bldg., Jackson, Miss.

NECA, Greater Kansas City Chapter. John L. Rose, Manager, 2201 Grand Ave., Kansas City 8, Mo.

NECA, St. Louis Chapter. R. E. Vierheller, Manager, 4657 Hampton Ave., St. Louis 9, Mo.

NECA, Carolinas Chapter. D. L. Casey, Manager, P. O. Box 4056, Charlotte 4, N. C.

NECA, Western Oklahoma Chapter. Tom M. Rushing, Manager, 704½ North Broadway Oklahoma City 2, Okla.

NECA, East Oklahoma Chapter. Horace Y. Strader, Manager, 1519 S. Boston St., Tulsa, Okla.

NECA, Chattanooga Chapter. W. C. Harris, Manager, 402 Chattanooga Bank Bldg., Chattanooga 2, Tenn.

NECA, Knoxville Chapter. W. G. Hoffman, 312 West Jackson Ave., Knoxville 24, Tenn.

NECA, Memphis Chapter. Raymond Calhoun, Manager, 170 Nell St., Memphis 12, Tenn.

NECA, Nashville Chapter. G. Paul Crowder, Manager, 115 16th Ave., North, Nashville, Tenn.

NECA, Panhandle Chapter. John H. Burt, Manager, P. O. Box 2283, Amarillo, Tex.

NECA, Central Texas Chapter. Tom Clawson, Manager, P. O. Box 881, Austin, Tex.

NECA, Texas Gulf Coast Chapter. Ray P. Hayes, Manager, P. O. Box 2049, Corpus Christi, Tex.

NECA, Northeast Texas Chapter. L. E. Martin, Manager, 1923 McKinney Ave., Dallas 1, Tex.

NECA, El Paso Chapter. John E. Blaine, Manager, 310 San Francisco St., El Paso, Tex.

NECA, North Texas Chapter. C. E. Wann, Manager, Westchester House, Apt. 102, 554 South Summit, Fort Worth, Tex.

NECA, Southeast Texas Chapter. Charles Scholibo, Manager, 4218 Yoakum Blvd., Houston 6, Tex.

NECA, East Texas Chapter. Harry L. Wren, Manager, P. O. Box 1236, Kilgore, Tex.

NECA, West Texas-New Mexico Chapter. Edward Strout, Manager, 105 College Ave., P. O. Box 121, Lubbock, Tex.

NECA, South Texas Chapter. Frank R. Stewart, Manager, 774 East Locust St., San Antonio 12, Tex.

NECA, Rio Grande Valley Chapter. R. N. Cummings, Manager, 607 West 4th St., Weslaco, Tex.

NECA, Virginia Chapter. Richard R. Smouse, Manager, 203 Roslyn Hills Dr., Richmond 26, Va.

NECA, West Virginia-Ohio Valley Chapter. James E. Swan, Manager, 610½ C St., South Charleston, W. Va.

INSPECTORS

IAEI, Alabama Chapter. Hugh Roberts, Secretary-Treasurer, Alabama Power Co., 600 North 18th St., Birmingham, Ala.

IAEI, Florida Chapter. R. H. Wellwood, Secretary-Treasurer, 2605 11th Ave., NW, Bradenton, Fla.

IAEI, Georgia Chapter. W. S. Smith, Jr., Secretary, 713 Broad St., Augusta, Ga.

IAEI, Kentucky Chapter. E. H. Rueppel, Secretary-Treasurer, 201 Citizens Bldg., Louisville 2, Ky.

IAEI, George Weiman Chapter. J. Clifton Young, Secretary-Treasurer, 317 Baronne St., New Orleans 9, La.

IAEI, North Louisiana-East Texas Chapter. Kenneth D. Hightower, 1710½ Centenary Blvd., Shreveport, La.

IAEI, Mississippi Chapter. C. B. Grauer, Secretary-Treasurer, P. O. Box 1790, Jackson, Miss.

IAEI, Missouri-Kansas Chapter. T. McGinnis, Secretary-Treasurer, City Hall, Topeka, Kan.

IAEI, St. Louis Chapter. Neil W. Butteiger, Secretary-Treasurer, 7427 Canton Ave., University City 14, Mo.

IAEI, North Carolina Chapter. C. S. Whitaker, Secretary-Treasurer, City Hall, Durham, N. C.

IAEI, Oklahoma Chapter. T. C. Wier, 1907 W. 41st St., Tulsa, Okla.

IAEI, South Carolina Chapter. N. R. Darling, Secretary-Treasurer, P. O. Box 390, Columbia, S. C.

IAEI, Tennessee Chapter. R. E. Ward, Div. of Fire Prevention, 102 State Office Bldg., Nashville 3, Tenn.

IAEI, Texas Chapter. R. L. Payne, Secretary-Treasurer, 3303 Schley St., Dallas, Tex.

IAEI, Texas Gulf Coast Chapter. M. W. McRaven, Secretary-Treasurer, P. O. Box 1700, Houston 1, Tex.

IAEI, Southern Section. A. M. Miller, Secretary, 910 West 30th St., Richmond 25, Va.

IAEI, Virginia Chapter. A. M. Miller, Secretary-Treasurer, 910 West 30th St., Richmond 25, Va.

IAEI, West Virginia Chapter. H. L. Parks, Secretary-Treasurer, P. O. Box 626, Charleston, W. Va.

MOTOR REPAIR SHOPS

National Industrial Service Association, Inc. Fred B. Wipperman, Executive Secretary, 818 Olive St., St. Louis 1, Mo.

NISA, Southeastern Chapter. M. E. Assalone, Secretary, 235 NW 2nd Ave., Miami 36, Fla.

NISA, Electric Motor Service Association of the District of Columbia. John W. Lainhart, Secretary, 913 E. St., NW, Washington 4, D. C.

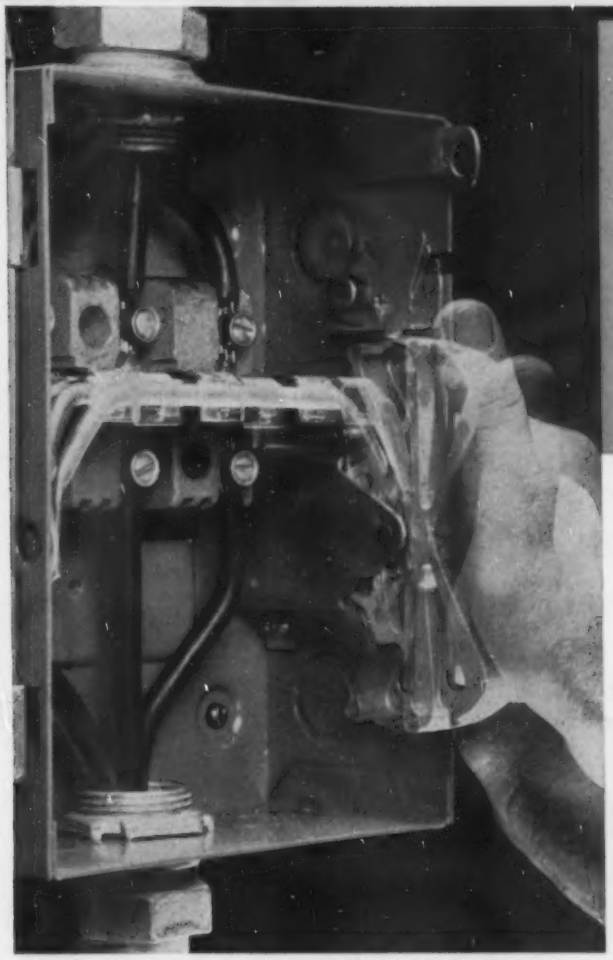
NISA, Louisville Chapter. W. C. Krauth, Secretary, 118 S. 1st St., Louisville, Ky.

NISA, New Orleans Chapter William Droit, Secretary, 1517 Calliope St., New Orleans, La.

NISA, Mid-South Chapter. Murphy G. Miller, Secretary, 109 Jennings Ave., Knoxville 17, Tenn.

NISA, Southwestern Chapter. George Foshee, Secretary, 203 S. Main, Fort Worth 4, Tex.

NISA, Electric Club of West Virginia. O. E. Jenkins, Secretary, c/o Guyan Machine Co., Logan, W. Va.



The positive arc-restricting switching action of BullDog's Clampmatic Vacu-Break Safety Switches is shown in the above demonstration photo of the switch interior. In all normal operation, the switch box door is closed.

MASTER CLAMPMATIC VACU-BREAK, unequaled quality and high performance. Acts as disconnect or service entrance switch. Fits applications up to 1200 amps.

JUNIOR CLAMPMATIC VACU-BREAK, deluxe general-purpose switch at an exceptionally low price. The complete line ranges in ratings from 30 amps to 600 amps.

Switch with Security!

GET BULLDOG CLAMPMATIC VACU-BREAK SAFETY SWITCHES

Greater safety . . . longer life . . . no costly maintenance!

With BullDog Safety Switches you provide real extras—in safety, in performance, in longer life. The two types shown—Master and Junior—cover a wide range of applications, meeting your client's needs with greater efficiency.

They feature these *Big 3* BullDog exclusives: (1) Vacu-Break® arc control, (2) Clampmatic® action, and (3) dependable switch mechanism.

The Vacu-Break control smothers arcs, minimizes pitting and burning. The Clampmatic action provides bolt-tight contact pressure. The BullDog switch mechanism *guarantees* positive switching security.

A switch to BullDog is a switch to real customer satisfaction . . . real profits. Consult your qualified electrical distributor or BullDog field engineer, or write BullDog Electric Products Co., Detroit 32, Mich.

© BEPCO

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

CONSULT THE FOLLOWING SOUTHERN REPRESENTATIVES:

WILSON ELECTRICAL EQUIPMENT CO.
2930 Commerce St., P.O. Box 1725
Houston, Texas

WILSON ELECTRICAL EQUIPMENT CO.
101 E. Maple St.
San Antonio, Texas

STANDARD ELECTRIC MFG. CO.
2401 Federal St., P.O. Box 1138
Dallas 1, Texas

WALKER ELECTRICAL CO., INC.
70 Bennett St., N.W., P.O. Box 8, Sta. D
Atlanta, Georgia

"DIE LUX"

(PRESCOLITE'S trade name for precision diecast products.)

PRESCOLITE applies aeronautical and automotive die casting production techniques to the lighting industry for **STRENGTH • DURABILITY • APPEARANCE**

The fixtures illustrated above, and many more too, employ "DieLux" die castings as an integral part of the unit. 1. No. WB-24 Wall Unit. 2. No. 1313-6630 Recessed. 3. No. 500 Ring Fixture. 4. A-14 Swivel Unit. 5. No. 8585 Hospital Light. 6. No. R-54 Exit Light. 7. No. 750 Recessed. 8. No. 99 Eyeball Unit.

Write for your copies of the following PRESCOLITE literature: No. 9 (Recessed and Surface Fixtures), No. EX-1 (Exit Lights), No. LL-1 (Louver Lights), No. HD-1 (Swivel Lights), No. AE-3 (Drawings and Specs.)

PRESCOLITE Mfg. Corp., Main Office, 2229-4th St. Berkeley 10, California • Factories: Berkeley, California • Neshaminy (Bucks County), Pennsylvania

You get **MORE** when it's Built by Allis-Chalmers

Overload Protection
—without false alarms

Thermalite Indicators are unaffected by momentary overloads

When you see the bright indicator lights you know that overloads are nearing the limits of transformer capability . . . you know it's not a momentary overload. Regardless of ambient temperature, *Thermalite* device indicates excessive transformer operating temperature.

How it Works

A thermal element located in the top oil, safely away from all live parts, actuates a signal lamp circuit. The brilliant signal lamp remains lit until reset by the convenient external handle. *Thermalite* indicators do not interrupt service.

No time-consuming load surveys are needed because the clear signal of a *Thermalite* indicator can be seen from the cab of a service truck.

Stretch Transformer Dollars

You can utilize the inherent overload capabilities of your system when low-cost *Thermalite* indicators are used on your transformers.

Get them on Allis-Chalmers transformers 167 kva and smaller, 15 kv and below.

Call your nearby A-C office for information or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Thermalite is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS A-4992

CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1048—Plug-in Strip
An illustrated catalog showing the complete "Plug-in" Strip line has recently been published by National Electric Products Corp., Pittsburgh, Pa. This eight-page illustrated brochure pictures the three and six foot standard lengths of the multi-outlet branch circuit assembly.

1058—Conductor Fittings
A handy, pocket-size catalog of their complete line of conductor fittings is available from Penn-Union Electric Corp., Erie, Pa. The 80-page catalog is thoroughly indexed and also has handy locator tabs for extra speed in use. Specifications and illustrations of each item are included.

1076—Modular Lighting
A 20-page booklet containing interesting and useful information about the "modular system" of lighting can be obtained by writing to the Mitchell Manufacturing Co., 2525 Claybourn Ave., Chicago 14, Ill.

1086—Cable Connectors
Tomic Sales and Engineering Co., 4864 Woodward Ave., Detroit 1, Mich., now have available catalog sheets containing data on the complete line of their connectors, couplings, and cable connectors.

1088—Fittings and Fixtures
A 32-page illustrated catalog covering Killark fittings and fixtures is offered by Killark Electric Mfg. Co., Vandeventer and Easton Aves., St. Louis 13, Mo.

1090—Midget-Size Busduct
Complete information on Power Plugin, the new, midget-size busduct, is found in bulletin No. 720, available from Frank Adam Electric Co., 3650 Windsor Pl., St. Louis 13, Mo.

1092—Electrical Boxes
Steel City Electric Co., 1207 Columbus Ave., Pittsburgh 12, Pa., offers a catalog of their complete line.

1130—Conduit Fittings
The latest completely illustrative catalog on their diversified line of conduit fittings is announced by the Atlantic Conduit Fittings Co., 589 Atlantic Ave., Boston 10, Mass.

1136—Space Heating Guide
Cavalier Corp., Chattanooga 2, Tenn., has prepared a Guide for Calculations on Electric Space Heating. It is based on study of several thousand installations of electric heat and is a handy reference for calculating electric heating requirements and estimating operating costs. The booklet contains discussion, charts, and floor plan examples.

1150—Fluorescent Fixtures
Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., has printed a new catalog of fluorescent lighting fixtures. The new catalog is divided into six sections, each printed in its own distinctive colors. First section is devoted to "General Data" and details of L&P manufacturing.

1166—Electrical Fittings
A 40-page illustrated catalog and price list on the Gedney line. Shown and listed are conduit, threaded entrance, SEC, EMT and ground fittings, and box connectors for both ormored and non-metallic cable. Copies are available from Gendney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

1178—Remote-Control Wiring
Bulletin 16-200 is a 36-page manual describing layout and installation of remote-control wiring, and is available from General Electric Co., Construction Materials Dept., Bridgeport 2, Conn. Advantages and explanation of the system are followed by illustrated installation procedure.

1184—Approved RHW Wire
Bulletin No. 1018 describing first Underwriters' Approved Type RHW Wire, developed to meet the new National Electrical Code standards, is available from Simplex Wire and Cable Co., 79 Sidney St., Cambridge 39, Mass.

1190—Electrical Fittings
Blackhawk Industries, Dubuque, Iowa, offers a complete catalog of electrical conduit and cable fittings. Also, a special publication giving detail drawings and instructions for installing service entrance masts on low or ranch type buildings.

1192—Wire Pulling Lubricant
Illustrated six-page folder showing the advantages of an improved Y-Er Eas wire pulling lubricant is available from Electro Compound Co., 3812 150th St., Cleveland 11, Ohio.

1200—Fluorescent Fixtures
Complete information on commercial fluorescent and incandescent lighting of all types, for offices, schools, libraries, etc., and all industrial locations available from Benjamin Electric Manufacturing Co., Leader Div., Northwest Highway, Des Plaines, Ill.

ELECTRICAL SOUTH
806 Peachtree St., NE
Atlanta 8, Ga.

April, 1956

Gentlemen:

Please send me the bulletins and catalogs indicated.

(Print Plainly)

Name ..... Title .....

Company .....

Address .....

City & State .....

Circle numbers below. Bulletins and catalogs will be mailed promptly.

1048	1058	1076	1086	1088
1090	1092	1130	1136	1150
1166	1178	1184	1190	1192
1200	1204	1214	1218	1220
1224	1230	1238	1240	1242
1244	1248	1250	1254	1258
1260	1262	1264	1266	1268
1270	1272			

The "General" commands an army of experts,
backed by expanding resources.
He is at your service.

General Cable... *at your service!*

LIVE BETTER . . . ELECTRICALLY!

GENERAL CABLE CORPORATION, 420 LEXINGTON AVE., NEW YORK 17 • OFFICES AND DISTRIBUTION CENTERS COAST-TO-COAST

1204—Conduit Fittings

Illustrated Catalog available upon request to Electrical Fittings Corp., Woodside, N. Y., or their nearest warehouse in your locality contains complete information on the company's electrical conduit fittings, conduit nipples, couplings, and elbows.

1214—General Catalog

General catalog of Royal Electric Co., Inc., Pawtucket, R. I., covering flexible service and lamp cords, cord sets, extensions, trouble lights, wiring devices and decorative Christmas lighting is available to wholesalers. Dealer catalogs may be secured from Royal distributors.

1218—Carbon Products

A 28-page catalog on Motor and Generator Brushes and carbon products telling how to order brushes, grade recommendations characteristics and description of brush grades is available from the Helwig Co., 2536 North 30th St., Milwaukee, Wis.

1220—Stadium Lighting

The Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill., announces the availability of a new eight-page bulletin, No. 605, on stadium lighting, describing in detail floodlighting of a typical outdoor athletic arena stressing the importance of using fully enclosed floodlights.

1224—Electrical Equipment

The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment, Distribution Panels and "E-Z-RED" Circuit Breakers.

1230—Compression Connectors

An illustrated 18-page bulletin (13A) describes Squeezon compression connectors for all overhead distribution connections from line wire to ground rod. Offered by James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo., the bulletin also describes the mechanical and hydraulic installation tools required and tells where to use each.

1238—Selecting Fuses

A 12-page descriptive handbook "Fuseology" tells how to get safest, most dependable, trouble-free electrical protection from fuses. Contains useful information on selecting right size and type of fuses—how to stop needless blows—avoiding poor contact and other troubles. Issued by Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1240—Catalog of Fixtures

Catalog No. 9 of Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley 10, Calif., available upon request, contains attractively drawn illustrations of fixtures and scale drawings of their dimensions, as well as descriptive information and suggested applications for each fixture in the Prescolite line. List prices of the fixtures in Catalog No. 9 is inserted as a separate sheet with each of the booklets.

1242—Distinctive Lighting Fixtures for the Home

Jay Lighting Manufacturing Company, Inc., 25 Quincy Street, Brooklyn 38, New York has available upon request a new six-page illustrated supplement featuring their fixtures for the home.

1244—New Electrical Fittings Catalog

Concise 36-page catalog illustrates and describes a complete line of electrical fittings, cable racks and wiring specialties. The catalog contains many detail drawings, clear-cut photographic illustrations of mast fittings, cable connectors, straps, hangers and ground clamps in a wide variety of types and sizes. For your free copy, write The M. & W. Electric Mfg. Co., East Palestine, Ohio.

1248—Conductor Armor

A new catalog of Superformed Armor Rods, Lineguards, Patch Rods, and Tap Armor describing various uses and applications of these products on everhead conductors is offered by The Fanner Manufacturing Company, Brookside Park, Cleveland 9, Ohio.

1250 —Electrical Enclosures

Catalog No. 5354 currently being offered to the trade by B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga., is a well-organized, 66-page manual giving complete descriptive information, prices, and specifications on all items in the B & C line of electrical enclosures. Copies are available free of charge to electrical contractors.

1254—Construction Anchors

"Anchoring for Power and Communication Lines," a completely illustrated manual on improving line construction with better anchoring, has been published by the Advertising Dept., the A. B. Chance Co., Centralia, Mo. The 25-page booklet shows how to install the right anchor at the right place in the right way.

1258—Drop light Reels

Catalog sheets on their complete line of 20, 30, and 40-foot Cordomatic drop light reels are available from Cordomatic, Div. of the Vacuum Cleaner Corp. of America, 1724 Indiana Ave., Philadelphia 32, Penna. All Cordomatic reels are made for wall or ceiling mounting and are UL approved.

1260—Lampholders

Multi Electric Manufacturing, Inc., 4223-43 W. Lake St., Chicago 24, Ill., has available copies of their Bulletin No. 555, which illustrates and describes the complete line of Multi Sparlites and accessories and fittings for these lampholders. Combination units are included.

1262—Fluorescent Fixtures

The new loose-leaf catalog recently issued by Southern Lighting Manufacturing Co., 501 Elwell St., Orlando, Fla., contains complete diagrams, specifications, and descriptions for all fluorescent fixtures which they manufacture. In addition to the information on commercial, industrial, and school fixtures, the catalog also lists hangers, troffers, troffer accessories, and incandescents which are available from the firm.

1264—Thiel Fasteners

Literature is now available on Thiel Easy Drive staples and other fasteners such as Hump Drive "Nail-Its," "Grip Type" 1-hole pipe straps, hangers, etc. Write to Thiel Tool and Engineering Co., 1417 N. Market St., St. Louis 6, Mo.

1266—Metal-Clad Swiitthgear

Detailed information on metal-clad switchgear is now available in two special bulletins, 7004-B and 7004-C. These booklets give descriptions, application data and specifications on units up to 15 kv and 500,000 kva interrupting capacity. Write I-T-E Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia 30, Pa.

1268—Lighting Fixtures

The Perfeclite Co., 1457 East 40th Street, Cleveland 3, Ohio, makes available the following literature: (1) Data Folder 54-B—4 pages of engineering information, prices and specifications on Plastic Indirect Concentric Ring Luminaires. (2) Data Folder EX-55-A—10 pages of information on Exit Units for all building locations. Complete engineering data and prices given. (3) Data Folder 56-A—information including prices and specifications on Ceiling Pan Fixtures and Vapor Proof Prismatic Exterior Fixtures.

1270—Aerial Ladders

J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio, has just published a 4-page catalog on their Series 2200, Mechanical Ladder. They also have a new catalog on their Series 2100 All-Hydraulic Ladder.

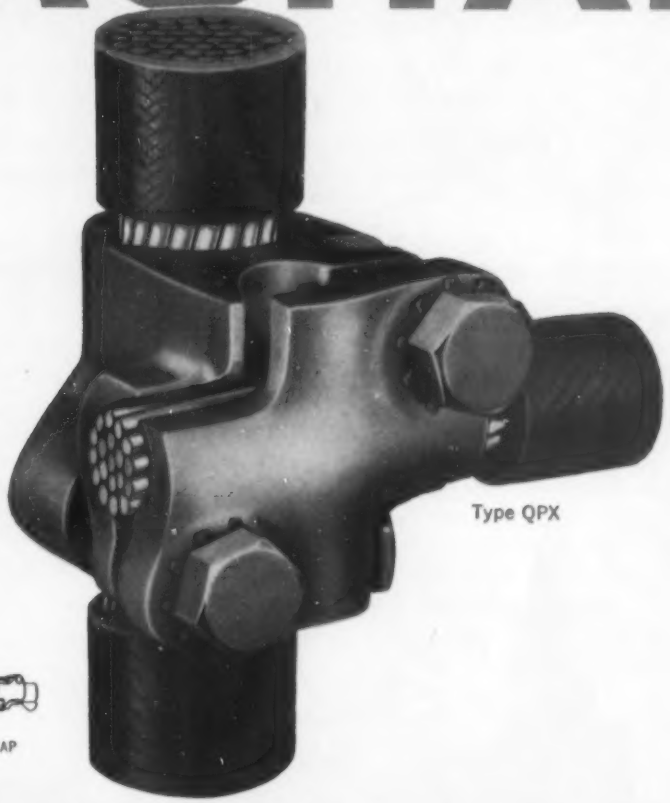
1272—Wireholders

Knox Porcelain Corporation, Knoxville 1, Tenn., has recently redesigned a one-piece metal base style reinforced wireholder, No. 5009. Base and screw are hot dipped galvanized. This wireholder has extra sharp threads and quick starting point to make driving easy. KNOX manufactures a complete line of Porcelain Wireholders, House Brackets, and other Secondary Service Materials.

"Brother, when they named this 'VERSITAP'..."

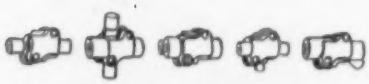
"...they knew what they were doing!"

VERSITAP



Type QPX

The virtues of VERSITAP:
Only a few sizes make any of 5 types of connections on cable sizes #6 through 1,000 Mcm. Easy to work; requires a minimum of stock; reusable.



SPLICE CROSS PARALLEL TEE TAP

BURNDY

55-8

Norwalk, Connect. • Toronto, Canada • Factories: New York, California, Toronto • Export: Philips Export Company

WHEN A GIANT DECIDES... BIG THINGS HAPPEN!

GLOBE, one of America's largest manufacturers of lighting fixtures, forges ahead to its rightful place at the top!

You've no doubt been hearing that momentous things are happening at Globe — And the rumors are right!

Here is what Globe has done during the past ninety days...

- **INTRODUCED** the most comprehensive newsmaking line in home lighting history
- **PUBLISHED** a full-color "portable showroom" catalog of the salable new Globe line
- **OPENED** its newly redesigned Manhattan showrooms, the most beautiful in the industry
- **HELD** lighting shows for hundreds of architects and decorators
- **LAUNCHED** a titanic advertising campaign aimed at all trade segments—jobbers, contractors, builders, architects, decorators, utilities, etc.
- **BEGAN** its mass media advertising schedule that will reach over 12 million consumer readers of such magazines as House Beautiful, House & Garden, Living for Young Homemakers, etc.
- **SET** the market buzzing with Globe fixtures featured on network television and in national magazines... and publicity tie-ins with Globe-inspired hats by the famous Mr. John
- **INCREASED** its national sales force by 40% coast to coast with greatly expanded warehouse facilities just completed to meet increasing demands

IT'S EASIER TO SELL GLOBE—THAN SELL AGAINST IT!

GLOBE

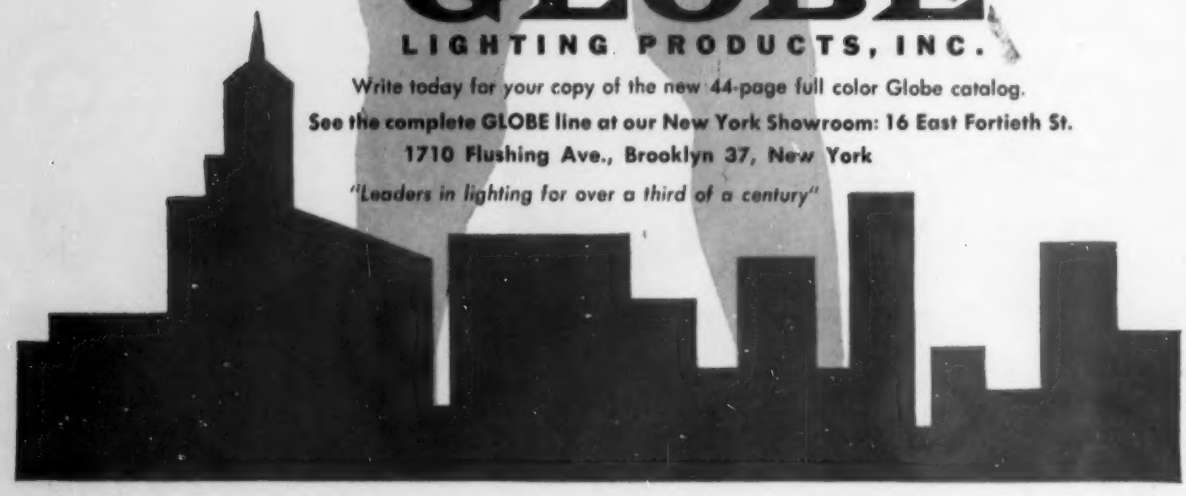
LIGHTING PRODUCTS, INC.

Write today for your copy of the new 44-page full color Globe catalog.

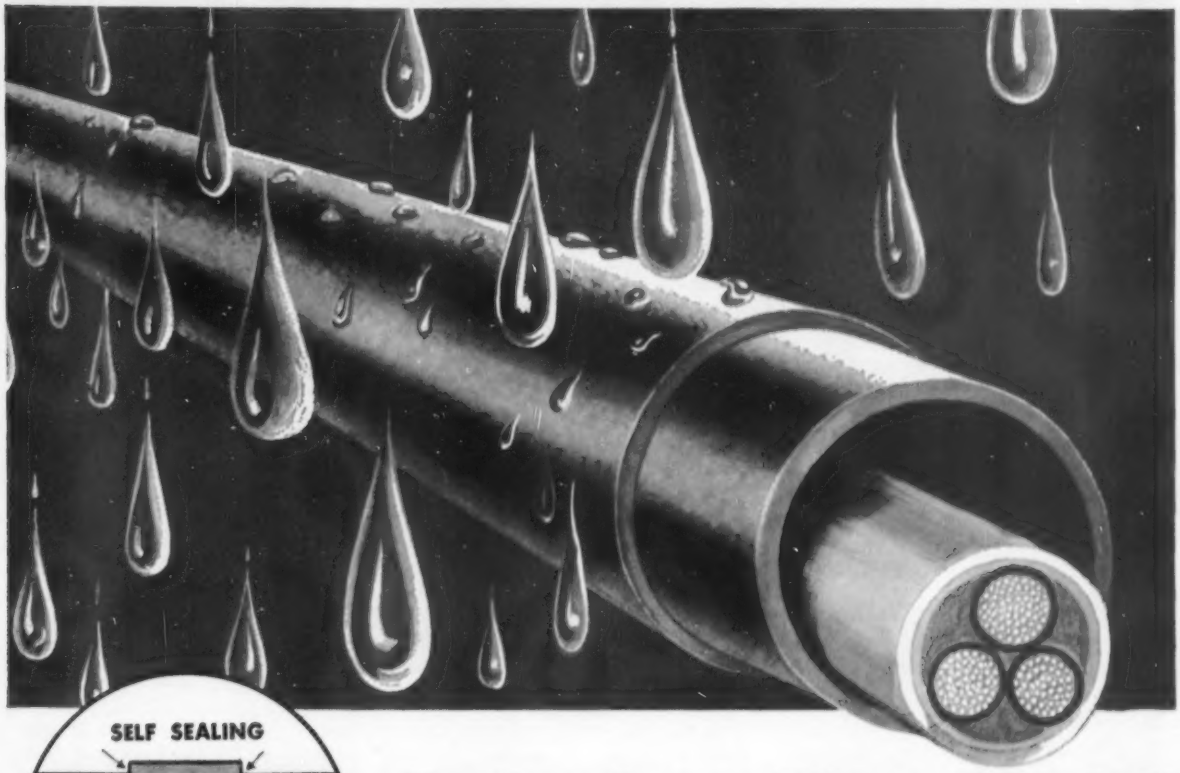
See the complete GLOBE line at our New York Showroom: 16 East Fortieth St.

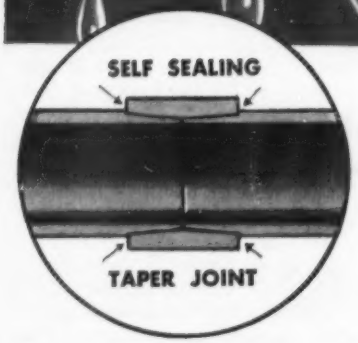
1710 Flushing Ave., Brooklyn 37, New York

"Leaders in lighting for over a third of a century"



WATERTIGHT!





Orangeburg Fibre Conduit Prolongs Cable Life

Keep out corrosive ground waters, and you prolong the life of underground cables, say utility engineers!

Why? Because ground waters containing corrosive elements derived from the soil and concrete encasement attack cable sheath and shorten cable life. Orangeburg's impermeable wall and self-sealing Taper-Sleeve Joint shed them *"like water off a duck's back."* You get maximum protection with Orangeburg.

Orangeburg protects cables in many other ways. Smooth bore, low co-efficient of friction reduce incidence of abrasion. Its material is strong, tough, resilient, durable.

No other conduit is easier to install

Light, 8-foot lengths and a complete line of bends and fittings speed installation. Taper-Sleeve Joints tap water-tight in a jiffy. Orangeburg lays faster and at lower cost than any other type of conduit.

Orangeburg Fibre Conduit has prolonged cable life at minimum expense for utilities, municipalities and industry since 1893.

Distributed by Graybar Electric Company and by General Electric Supply Company. Branches and stocks in principal cities.

WRITE DEPT. ES-46 FOR CAT. 52

ORANGEBURG MANUFACTURING CO., INC., Orangeburg, N. Y. **West Coast Plant, Newark, Calif.**

ORANGEBURG®
FIBRE CONDUIT

Seaquarium wiring goes underground

◆ WHEN THOUSANDS of visitors strolled across the grassy island in Biscayne Bay for the opening of the $2,300,000 Miami Seaquarium in Florida, recently, few of them realized they were walking on top of a modern-day buried treasure—miles and miles of pulsing electrical circuits.

More valuable than pirate's gold, this intricate maze of underground power cables buried 30 inches below the sandy surface of the 55-acre mangrove island, is the nerve center of the many attractions at the nation's newest and largest exhibit of salt water aquaria.

Two miles or more of 5000-volt direct burial cable provides power for the fifty- and eighty-foot steel tanks, 26 corridor aquaria, a sea lion arena, seal house, disposal plant, gift and camera shops, administrative offices, and a snack bar.

by B. H. Stewart

Electricity pulsing through the underground cables turns pumps and motor, generators and amplifying systems, turns on 24 1000-watt underwater floodlights in the pools, illuminates a 1200-car parking lot and a 750-foot viewing channel. It provides power for switchboards, air-conditioned offices, and for refrigerating thousands of pounds of frozen fish and squid in a food locker.

Primary service line

The primary service line lies almost five miles from the main entrance gate of the Seaquarium. This 13,200-7620-volt Anhydrox-shielded cable, enclosed in 5-inch conduit, feeds from the Florida Power and Light Company's Miami Beach Steam Electric Station on the MacArthur Causeway.

From this station it runs underwater across Government Cut, overhead across Fisher Island, underwater again at Norris Cut and overland across Virginia Key into the customer's vault at the administration building.

From an automatic transfer oil switch in this vault, the voltage is primary metered by FP&L and the service reduced to secondary for use in administrative offices, ticket booth, and the gift shop, all of which use 240-480 voltage.

From this transformer vault, the primary runs through another core duct line through two manholes to the transformer vault in the $200,000 filter plant in the center of the Seaquarium site. Here it enters two oil switches, one of which connects to a bank of three 75 kva transformers. This second-

ary is 120-240 for three-phase lighting, which is used throughout the project to economize on pipe and wire costs.

The light transformer bank also controls the speaker system in the main building.

The power switch has a bank of three 480-power three-phase transformers. One RO transformer controls all street lights ("coolie-hat" type) and parking lot lights. Sixty 6.6-ampere, 2500 lumens lamps comprise the parking lot system. Five of the front lights are mounted on 26-foot high concrete standards, and lights inside the aquarium are mounted on 12-foot steel standards.

Each light is shielded by a modernistic three-foot wide "coolie hat" of spun aluminum.

Scotty Lovelace, superintendent for Maurice H. Connell and Associates of Miami, engineered the cable layout. Wiring was installed by Ferguson and Roberts, prime electrical contractors.

Heart of system

The "electric heart" of this vast veined conduit system is located in the main distribution center of the Seaquarium building. It employs a 600-volt three-pole enclosed safety switch. From this main switch are supplied five smaller distribution panels having from 30-60 circuits each. Circuit breakers are used throughout.

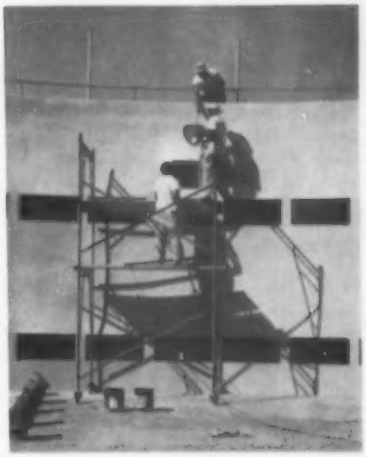
Sixteen 1000-watt Westinghouse Aqualux underwater floodlights illuminate the aquatic animals during regularly-scheduled feeding shows in the 80-foot tank, when divers go down to feed the inhabitants.

The convex lenses of these floodlights diffuse the light to every spot in the tank. They are designed for the water to cool the lenses. Neoprene wire is used throughout to connect the floods to control switches. The stainless steel casings for these lights were welded right into the steel tank during construction, before the entire tank was gunited or covered with cement under pressure. The lights themselves weigh about 60 pounds and are mounted in a brass pivot, which can be adjusted from topside to tilt the light in a desired direction.

Indirect lighting around the side of the tank's top deck employs 300-watt Revere lights (white) and grey outside reflectors. 1000-watt white light bulbs light the overhead installations along all walkways.

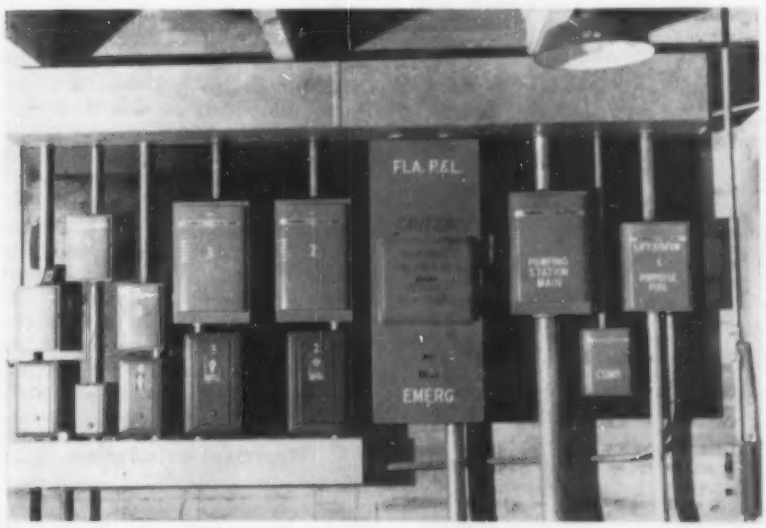
Twenty-six especially lighted 4½ to 6½ feet corridor aquaria in the circular corridor around the main tanks house the smaller tropical fish—cowfish, frogfish, seahorses and thousands of smaller creatures which couldn't survive in the main tanks. Daybrite fluorescent lamps are suspended above these tanks, which are built into the corridor wall. Special G-E Photofloods, especially balanced

(Continued on page 24)



Workmen install one of 16 1,000-watt underwater floodlights in stainless steel framed box.

Underground cable leads to 64-foot kidney-shaped sea lion arena where it supplies underwater floodlights.



Control panel inside the $200,000 filter plant regulates flow of filtered salt water to the arena; to the 565,200 and 260,252 gal. main tanks; to 26 smaller corridor aquaria; and to 750-foot circular viewing channel.

Concrete blocks make up an improvised cable reel holder. Two miles of buried cable distribute power.

Wiring for a hospital

Lee Harvill, Harvill-Byrd Electric Co., checks blueprints over shoulder of Chief Engr. Bert Steely.

◆ WHEN the electrical contract was let for the new 100-room addition to the Arkansas Baptist Hospital, Little Rock, Ark., one of the major specifications presented a problem to the electrical contractor, Harvill-Byrd Electric Co. At no time, during the eighteen months required to complete power installation, could service be disrupted in the old building.

Because service in the old building had to be integrated with the new, the switchover must be accomplished with hot wires in the new addition, and all connections made with power on the old switchboard.

Two of eight electricians on the job wire the doctors' call system and the modern two-way dialmatic nurses' call system which enables the patient in his bed to talk with the nurse at her duty station.

The Harvill-Byrd shack at one corner of the 100-room addition to the Arkansas Baptist Hospital is headquarters for the 18-months job.

Feeder system

The five-floor, 100-room addition was constructed at the front of the older section, utilizing space that formerly had been landscaped grounds. The electrical service in this new part had to feed power to numerous modern innovations in treating and caring for patients and medical personnel which had not been provided in the old building.

Service is taken from the older building for the new, and is then fed back into the old building. In order to reduce line loss and to keep the size of copper to minimum, stepped-up voltage is employed for the purpose of transmitting power to the old part.

The local power company set up an underground transformer station. Service comes in at 220 volts, goes into the new building at 220 volts, and is stepped up to a motor voltage of 440 volts to serve the old part of the hospital.

In the basement of the new section a 4000-ampere Pringle switch is built into the distribution board. Adjacent to this is the 500-kva 3-phase transformer.

Although the job had not yet been completed at the time this was written, and the switchover has not been made, Superintendent Bill Blazer said that there never has been a momentary stoppage of service to the old building, where all patients and hospital facilities are housed now. When the switchover is made, it will be accomplished by phasing out circuits between the two switchboards so exactly all the way that the checking out will be accomplished with no power interruption.

Electrical installations

One of the interesting electrical installations is the Royal Automatic nurse call system, a Dialmatic system that provides two-way talk between patient in his bed and nurse at her duty station.

extension

An electronic system of communication, with under-pillow speaker, enables the patient to communicate by voice with the nurse. At night, the instrument is sensitive enough to enable the nurse to pick up her earpiece at the desk and listen to the patient's breathing.

Wiring luxuries include a television outlet in every room, with a centrally connected antenna on the roof.

There are two motor control centers, one in the basement, another in the penthouse for additional equipment on the top floors of the building. The switchboard is in the basement.

There is no auxiliary power now, but a standby generator eventually will be installed in the basement.

Busway is utilized at 4,000 amperes capacity, terminating in a tunnel, where power is connected. There are 28 pieces of bus, eight per phase, with four for the neutral.

Prefabrication work

All prefabrication work is done at the contractor's plant, housed in their attractive new building in a suburban section of the city. Besides having modern facilities at the plant for handling large industrial and commercial jobs, the owners have provided excellent parking facilities.

The crew at work on this eighteen-month hospital job consists of eight men, headed by Superintendent Bill Blazer, working under Chief Engineer Bert Steely.

Superintendent Blazer was enthusiastic about the time and trouble saved on the job because all contractors and sub-contractors worked together in complete harmony and efficiency. Every Friday morning the general contractor, the Baldwin Company, called a meeting of all contractors, including a representative of the electrical contractor. A representative of the architects, Erhart, Eichenbaum & Rauch, was also in attendance. At this meeting plans to coordinate all work were made, and each subcontractor had a voice in them.

Tool inventory system reduces job expenses

◆ A TOOL-KEEPING board relating current construction jobs and the tools withdrawn from reserve for those jobs permits S. Silverberg, co-partner of Silverberg Electric Co. in Washington, D. C., to know at a glance precisely where each tool can be located. This accurate record which keeps tabs on a tool reserve valued at over $2,000 has kept loss down to a bare minimum, has saved time and steps in furnishing an instantaneous location of tools, and has saved paperwork.

"While we are a medium-sized shop with an average of 15 jobs current, I can visualize the control board and system of tool-keeping as applicable to any size business," said Mr. Silverberg who devised the tool keeping system.

The board is 17-inches x 36-inches and has 19 columns across with five hooks under each column. Four of the 19 columns at the right are for reserve tools; 15 columns to the left are jobs under current construction. Each tool has a ticket indicating tool, size, manufacturer or trade name.

Quick Identification

To quickly identify a tool that may be wanted on a job when it is out elsewhere, a series of colors has been put into effect. Red is for electric drills, green for metal punchers, blue for ladders, yellow for steel tube benders and white for miscellaneous.

Tools in the shop have their tickets on the reserve hooks of the board. As soon as tools are withdrawn on a job, their tags are placed on a hook in the column headed up by a small white erasable pressed-board plate, about one-inch square, naming the job and its location. This white plate is held in place by a spring clip.

(Continued on page 102)

Here is a tool-keeping system that indicates plainly the job on which a tool is being used. S. Silverberg, co-partner of Silverberg Electric Co., in Washington, D. C., is checking the location of a tool urgently needed on another Silverberg job.

Cost factors of textile mill

Part 2

by Howard R. Pancoast
President, Bryant Electric Co.
High Point, N. C.

◆ CONTRACTOR - CONTROLLED cost factors fall into three principal groupings: Construction engineering, job methods, and tools and equipment. Each of these will be considered separately.

Construction engineering involves the work necessary to convert a design job into a construction job. Depending on the leeway permitted by the specifications, the estimator-engineer studies such items as the routing and combining of feeder and branch circuits, use of parallel runs and parallel conductors, overhead vs. underfloor circuits, size and location of pull and junction boxes and the corresponding cable lengths, and the best hanging and fastening methods for circuits and equipment. After deciding these points, he prepares sketches, diagrams, and special instructions for the construction crew.

He also prepares a work sched-

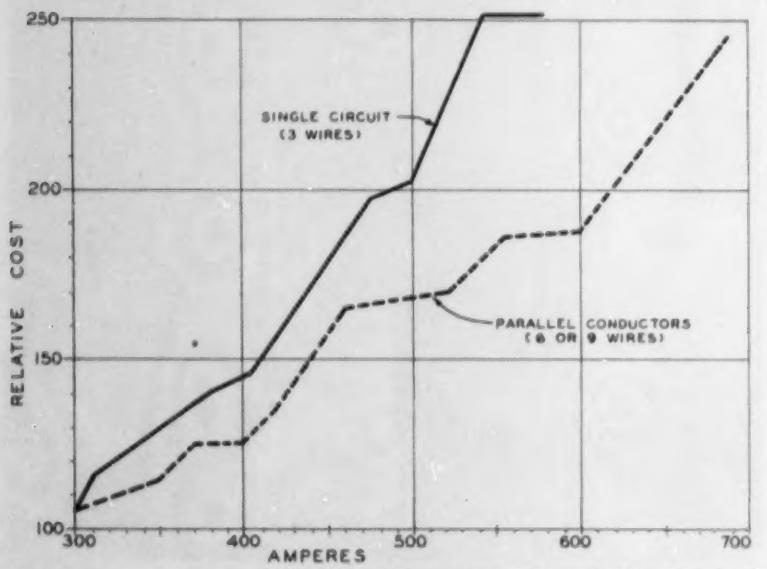
Table 3—Combining circuits

Two or more circuits are sometimes combined physically (not electrically) in a single conduit for economy. The following tabulation shows the comparative cost for several common sizes of branch circuit and feeder conductors. The comparison is based on the relative cost per ampere-foot for RH wire, in rigid conduit run overhead on steel. Of the sizes checked, combining circuits is economical only for #10. (Note: Conductor capacity has been reduced to 80% for 6 wires in a single conduit and 70% for 9 wires in a single conduit per NEC rules.)

	Item	Relative cost 3 Wires	6 Wires	9 Wires
Branch circuit	#12 Conductor	100	105	109
	#10 Conductor	100	94	98
	#8 Conductor	100	110	109
Feeder circuit	#4 Conductor	100	111	119
	#1 Conductor	100	120	125
	#2/0 Conductor	100	115	119
Feeder circuit	#4/0 Conductor	100	103	117
	#350 M Conductor	100	106	*

Table 4—Parallel conductors

This graph indicates the saving which may be made by substituting smaller parallel (or multiple) conductors in place of sizes 300 MCM through 1000 MCM, RH or VC insulation. (See NEC Article 3105 for applicable rules.) The bar chart below indicates the most economical combination of RH or VC conductors for any load current between 300 and 700 amperes.



NOTE: 6 WIRES ARE RUN IN 2 SEPARATE CONDUITS, AND 9 WIRES IN 3 SEPARATE CONDUITS.

Table 1—Cost data

Following is an outline of the cost data included in this article:

Contractor-controlled costs

Table 2 — Parallel runs
Table 3 — Combining circuits
Table 4 — Parallel conductors
Table 5 — Overhead vs. underfloor circuits
Table 6 — Conduit fastenings

Tools and equipment

Table 7 — Power bender
Table 8 — Compression Tool

Design controlled costs
(To follow in Part 3)

Table 9 — Conductor insulations
Table 10 — Minimum standards of wire and conduit
Table 11 — Voltage drop and power loss
Table 12 — Wiring methods; VCI cable and busways
Table 13 — Miscellaneous items

low voltage power distribution

ule and a labor budget for the principal divisions of the job. Unless the contractor maintains a separate purchasing department, the estimator-engineer also takes care of material purchasing, material control budgets, and scheduling and expediting to meet the job construction requirements. Information would be furnished to the job supervisor on what is bought, and the purpose for which it was intended.

As a rough general rule, each hour spent in construction engineering may be expected to save about 5 manhours of job labor. Comparative cost studies have been made of several specific items in this group. Table 1 lists these, and the comparative cost data is presented in the following tables. While sizeable savings in individual items will be noted, some of these may have only a very minor effect on the over-all cost.

For example, consider the item of the hanging and fastening of the power feeder and branch circuit conduits. Our study shows a cost variation of 340%. However, the range of possible methods which can be used on a particular job is limited. Furthermore, if the hang-

(Continued on page 102)

Table 2—Parallel runs

Where practical to do so, a saving in labor and over-all cost can usually be made by installing a group of feeder conduits on trapeze hangers rather than hanging each conduit independently. The following comparison is based on 500 MCM conductors in 3-inch conduit. The same total length of conduit has been included for each item.

Item:	Relative cost:
Single run	100%
2 conduits, parallel	94%
3 conduits, parallel	93%
4 conduits, parallel	92%

Note: These are separate circuits. They are physically parallel, but not connected electrically. Additional circuits run on the same hangers would reduce the relative cost and increase the saving.

Table 5—Overhead vs. underfloor

Underfloor circuits offer a possibility of cost saving, because scaffolding and fastenings are eliminated, labor reduced, and circuit length may be shortened. A larger size of conductor may be required underfloor because of reduced rating per NEC rules. An underfloor circuit in lead cable is generally more expensive than the equivalent overhead circuit.

Item			Amps	Relative cost
Typical feeder circuits	Overhead	3 #1 RH 1½"	130	100
	Underfloor	3 #0 RW 1½"	125	82
	Underfloor	3 #0 RR 1½"	125	90
	Underfloor	3 #0 RL 2"	125	107
Typical branch circuit	Overhead	3 #10 RH ¾"	30	100
	Underfloor	3 #10 RW ¾"	30	68
	Underfloor	3 #10 RR ¾"	30	72
	Underfloor	3 #10 RL 1"	30	106

Table 6—Conduit fastenings

This tabulation shows relative costs per 100 feet of conduit for fastening exposed feeder or branch circuit conduits, using methods which are common in textile mill work. The Bryant Electric Company symbols are used for "short-hand" entries on the take-off sheets, estimates, etc. (Note: Total installed cost labor and material for all fastenings for power feeder and branch circuits on hypothetical job is 3.3% of the distribution system cost, or 1.6% of overall job budget.)

Surface	Fastening	Symbol	Relative cost
Wood	Wood screw, 2-hole strap	W2	100
Wood	Wood screw, 1-hole strap	W1	191
Cinder block	Toggle bolt, 1-hole strap	TB1	228
Tile wall	Same	TB1	266
Brick wall	Lead anchor, machine bolt, 1-hole strap	AB1	266
Concrete	Same	AB1	340
Steel	Korn clamp or similar	K	167
Steel	Machine bolt, 1-hole strap	B1	293
Steel	Powder stud, 1-hole strap	PS1	179

Table 7—Power bender

This study compares the installed cost of standard factory conduit elbows with the cost of field bends made on a motor-driven power bender. While the percentage saving is large, the dollar savings on small jobs may not be enough to pay transportation costs for the bender. (Note: For the hypothetical job, this saving equals 5.4% of feeder conduit cost, 2.04% of total feeder cost, and 0.18% of total electrical budget.)

Item	Relative cost					
	1"	1¼"	1½"	2"	2½"	3"
Factory elbow	100	100	100	100	100	100
Field bend	29	31	37	47	44	42

Code interpretations clarify wiring rules

◆ A SERIES of five official interpretations of the 1953 National Electrical Code have been released by the National Fire Protection Association, it was announced by Charles L. Smith, Electrical Field Engineer of the NFPA and Secretary of the National Electrical Code Committee. These interpretations are in addition to the official interpretations of the 1953 Code previously released and will be included in the 1956 edition of the National Fire Codes, Vol. V, Electrical, to be published by the NFPA in September of this year.

These interpretations, developed through the established committee procedure in response to requests, have been reviewed and released by the NFPA Electrical Correlating committee.

Subjects covered include abandoned circuits in underfloor raceways, room thermostats used as disconnect means, bare conductor in service entrance cable for equipment grounding, continuity of cables and raceways, and wiring of churches.

The official texts of the interpretations follow:

Interpretation No. 427

Sections 3546 and 3547; abandoned circuits in loop wiring; under floor raceways.

Question No. 1—Is it the intent of Sections 3546 and 3547 to prohibit the running of the same conductors to the individual outlets in raceways, so-called loop wiring?

Answer—No.

Question No. 2—If it is not the intent to prohibit loop wiring, as mentioned in Question No. 1, is it permissible in the event of discontinuance of one outlet to take the conductors supplying that outlet and place them back in the raceway or must these conductors be removed from the raceway and a new set of conductors inserted to supply the other outlets previously connected in the loop?

Answer—The sections of circuit conductors which become unused when an outlet is abandoned, discontinued, or removed must be removed from the raceway. No spliced or reinsulated conductors may be allowed to remain in the channels or headers of an underfloor raceway system.

Interpretation No. 428

Section 4241; room thermostats when used as a disconnect means.

Statement: A room thermostat incorporates a two-pole manually controlled switch. When the thermostat is moved to the "Off" position, the two-pole switch breaks both sides of the line and the circuit can not be re-established automatically by operation of the thermostat. The thermostat is used in connection with a fixed electrical space heating installation. It has been tested and found suitable for interrupting the maximum current of the heating installation.

Question—Does such a thermostat satisfy the intent of Section 4241 as to a suitable disconnecting means or must there be another switching means available as a disconnect other than the main service disconnecting means?

Answer—Yes, such a thermostat satisfies the intent of Section 4241.

Interpretation No. 429

Section 3382; use of bare conductor in service entrance cable for equipment grounding.

Question—Under the intent of Section 3382 may approved three-conductor service entrance cable having two insulated conductors and one conductor without individual insulation be used for two-wire branch circuits where the uninsulated conductor is intended solely for equipment grounding purposes?

Answer—Yes.

Interpretation No. 430

Sections 3005, 3007, 3013; continuity of cables and raceways.

Statement: In a machine shop (not a hazardous location) constructed with 8-inch concrete block walls, open wood joist ceiling, a 12-2 armored cable is run from a ceiling lighting outlet about 12 feet on the side of a wood joist to a point 12 inches from the wall, and then the same conductors, from which the armor has been removed, are installed in a run of ½-inch EMT about 10 feet to a receptacle on the wall. All work is on the surface and exposed. An EMT connector, conduit coupling, and an armored cable connector are used where the two types of wiring are joined. The conductors are not spliced.

Question No. 1—Does Section 3005 require a pull box to be inserted in this run where the change is made from EMT to Armored Cable?

Answer—No. Section 3005 is not applicable.

Question No. 2—Does Section 3007 require a box at the junction point where the EMT and Armored Cable join?

Answer—Yes.

Question No. 3—Does Section 3013 prohibit the installation described?

Answer—No, if the raceway is completely installed first.

Question No. 4—Are the Type R Conductors which were part of an approved cable assembly also approved for use in a raceway after several feet of armor have been removed?

Answer—Yes.

Interpretation No. 431

Section 5201; requirements for wiring of churches.

Question—Is it the intent of Section 5201 of the 1953 edition of the National Electrical Code that churches be included by the phrase "and other buildings used for public assembly"?

Answer—Yes.

Seaquarium wiring

(Continued from page 19)

for black and white or colored film may be flicked on (and regular lighting flicked off) by a wall switch, enabling amateur and professional photographers to take pictures of fish.

Prescolite fixtures (flush units) are concealed beneath the beams on the walkway joining administrative offices with the ticket office and gift shop.

Wiring conference reviews new programs

◆ THE ATTENDANCE of more than 370 at the 12th annual conference of the National Adequate Wiring Bureau, held in Chicago recently, broke all previous records. The theme of the conference was the need for greater coordination between all electrical industry groups in the interest of promoting adequate wiring in the homes of America.

In his keynote address, C. T. Bremicker, chairman of the National Adequate Wiring Bureau and vice-president (sales), Northern States Power Company, Minneapolis, Minn., summed up the progress made to date in developing such cooperation nationally so that local promotions may be similarly coordinated.

According to Mr. Bremicker, increased national attention to adequate wiring promotion was first shown in 1954, and was greatly accelerated during 1955. For the past 18 years, practically the only national assistance available to local electrical interests on the adequate wiring score was that provided by the National Adequate Wiring Bureau.

Despite the fact that the bureau can be credited for having performed yeoman service in focusing the attention of editors of national women's and shelter magazines on the problems of inadequate wiring, he said, it was still largely up to the local electrical industry to carry the full burden of advertising and promotion of the program in each community.

Programs have impact

Today, said Mr. Bremicker, we face a greatly changed situation. The "Housepower" campaign, being sponsored by the Edison Electric Institute, is in direct support of the objectives of the Bureau. The Live Better—Electrically Program, closely akin to the same objectives, provides national advertising support on a scale never before considered possible. Continuation of adequate wiring advertising by Kennecott Copper Corp., Anaconda Copper Corp., and Owens-Corning Fiberglas Corp., as well as the NAWB's own expanded national advertising, further swells the total impact.

All of these programs, stated Mr. Bremicker, will stretch to the maximum the manpower available to local electrical industry groups, provided that interest generated by these programs is followed through and converted into sales.

Home wiring modernization was given special emphasis through two one-hour feature presentations: the Philadelphia Electric Company's "100-A" adequate wiring promotion program was delineated by the company's vice-president in charge of sales, George E. Whitwell, and the United Illuminating Company's activities were outlined by three members of the company: L. A. Dunn, merchandise manager, C. A. Priebe, builder sales specialist, and K. B. Batchelor, supervisor of adequate wiring and display.

The two companies, having a similar goal but a completely different type of market, have approached their adequate wiring promotions from entirely different angles. The Philadelphia Electric Company, with 640,000 homes in the area they serve needing rewiring, have used extensive advertising and promotion means to achieve results. Mr. Whitwell spoke of the company's plans to implement the housepower program of EEI, the continued national program of the Adequate Wiring Bureau, the help offered by NECA, the "Live Better . . . Electrically" promotion, and "Operation Home Important" during 1956.

Solicitation effective

The United Illuminating Co., of Connecticut, using a much smaller budget and with 122,000 homes needing rewiring, have relied a great deal on direct mail to educate consumers and to set up wiring business for local contractors. Post-paid business reply cards sent out with monthly bills to all of the utility's customers, are screened by UI through follow ups of their representatives before being turned over to local contractors. Out of 1,000 cards returned, 596 screened leads have developed from this source alone.

In the panel discussion, "Tomorrow's Wiring Standards," two panel members dramatized for the conference their experiences with the kinds of loads which, according to the moderator, W. T. Richards, vice-president in charge of Sales, Indianapolis Power and Light Co., Indianapolis, are still being dreamed about in other areas in the country.

Harold Wright, electric home planner, representing the Washington Water Power Company, Spokane, and Robert E. Reeves, chief heating engineer of the Electric Power Board of Chattanooga, Tenn., differed to some extent in their ideas of the methods of approaching the solution of wiring problems. However, they agreed that provision for future growth in home wiring installations should be made when the home is under construction, and that no matter how well equipped the home is, wiring-wise, to provide for present-day wiring needs, the factor of future electrical equipment should be considered.

The two other panel members agreed with this premise: John H. K. Shannahan, commercial manager, Indiana-Michigan Electric Co., Fort Wayne, and Lowell R. Mast, Electromode Division of Commercial Controls Corp., Rochester, N. Y., representing the Electric House Heating Section of NEMA. Mr. Shannahan, who represents an area which is beginning to aggressively promote electric home heating, took the position that the customer who accepts electric home heating has already been compltely sold on living better electrically. Therefore, this consumer is preconditioned to making the necessary wiring investment, permitting full use of electric service.

Local effort essential

In his address, "The Time Is Now," C. W. Higbee, manager of wire and cable sales, United States Rubber Co., New York City, brought out the fact that national promotion of adequate wiring now being carried on so extensively will all go to waste unless local manpower and tie-ins are used to

(Continued on page 102)

Successful home lighting promotion

by Baron Creager

A dinner meeting for architects held by Dallas Power and Light Company outlined the campaign. Similar meetings were held for electrical fixture distributors and home builders. At right are some of the hard-to-light applications the company featured at the State Fair of Texas.

Lighting in this bedroom is designed for comfort and illustrates all the practical aspects of good lighting. The flexible lighting system consists of functionally located, recessed 150-watt fixtures, lighted drapes and portable lamps. For flexibility, elements can be switched separately.

◆ A COMPREHENSIVE long-range home lighting program "Light Up for Better Living," introduced recently by Dallas Power and Light Company, promises extensive and continuing results in promoting better living and in increasing business for various branches of the electrical industry.

The program will seek to develop on a continuing basis a greater customer interest in light for living. Promotions will be directed to customers, builders, architects, and electrical contractors, seeking to show how better quality lighting more abundantly used makes a home more livable and therefore more desirable and more salable.

Most home lighting promotions of past years have been largely concentrated on the use of portable lamps, but this program will encompass the total lighting job in the home. DP&L will work with and invite the cooperation of home builders and architects; manufacturers and suppliers of permanently installed lighting fixtures and equipment; manufacturers and dealers of portable lamps and related equipment; interior decorators; electrical contractors who install the equipment, including the electric wiring.

Long range objective

Lighting design and practice in commercial establishments, especially the better, modern stores, has reached an advanced state. Light is commonly used in many imaginative ways, for decoration and selling. DP&L's long range objective for home lighting seeks to bring about a lighting practice and technique for the home comparable to that now employed in commercial interiors—but adapted to the home environment.

Home designers and interior decorators will be invited to collaborate in designing a new atmosphere for the interior decoration of the home, using light in as many imaginative, but practical, ways as possible.

All of the company home service advisors are trained in the application of lighting in the home as well

as other uses of electric service. One advisor, however, has been assigned exclusively to home lighting promotion. She will be available for consultation with individual home owners or builders as required. She also will work closely with lighting equipment dealers, including portable lamp dealers. Her purpose will be to assist in training salespeople among the lighting equipment and lamp dealers.

The company's three builder contact men will be responsible for making regular contacts with home builders and residential architects, selling the idea of better lighting along with other applications of better living.

This group also will be responsible for developing and carrying out display home projects in which completely light conditioned homes are shown to the public.

Two or more members of the company's lighting service division will work on home lighting design. This group will be available to home service advisors and the builder contact group for consultation and assistance in preparing lighting recommendations for new homes. The lighting service division also will be responsible for assisting in the training in lighting of the home service advisors and builder contact personnel, for preparing data for the company's published "Home Lighting Ideas," and the preparation of scale drawings of lighting applications to be used in the program.

Design ideas available

In addition to advertising, demonstrations and displays that will be directed to the customer, the company will make "home lighting ideas" available to architects, designers and builders. These will be reproductions of photographs of home lighting installations. Illuminating Engineering Society data sheets, which contain similar design ideas, also will be used.

Again in 1956, as in past years, the company will actively participate in the State Fair of Texas, the largest state fair in the world. Last year the company featured a number of hard-to-light home applications, and interest in these displays was very gratifying.

It is realized that the modern, well lighted home needs a wide selection of portable lamps, as well as permanent type lighting equipment. The company makes every

(Continued on page 100)

Know the law

by Arthur L. H. Street

Husband not always wife's agent

WHEN A MARRIED MAN arranges for electrical installations and is not known to be sufficiently solvent to permit his being held personally liable for the contfact price, some risk will be run in assuming that a mechanic's lien can be enforced against the building in which the installations are made. Perhaps, his wife owns the building or has a half interest in it.

It would seem that where the amount involved is large and it is desirable to rely upon the security of a mechanic's lien, the contractor should assure himself that his patron is sole owner or, if he is not, that the contract is authorized by the wife.

Joint ownership

In a case decided not long ago by the North Carolina Supreme Court (General Air Conditioning Co. v. Douglass, 84 S.E. 2d 828) the company sued to collect on a contract for installing a heating system, and to enforce a lien against the house in which the installation was made. The court decided that because the wife had not made the husband her agent and he alone signed the contract, which she had not ratified, the husband was solely liable for the price and no lien could be attached to the house, which she jointly owned with him.

The decision was partly rested upon the rule of law that a husband has no implied power to act as his wife's agent in matters pertaining to her property, and, moreover, that in this case the husband had not professed to act as her agent.

Legal importance of books of account

THE ELECTRICAL CONTRACTOR who has not already done so should check with his local lawyer as to whether or not his books of account showing charges against his patrons *on open account* are so kept that when presented in court they would be legal evidence as to what work or materials were furnished a customer who denies that he owes as much as the contractor claims.

When the contractor sues, he must be able to definitely prove just what he has furnished and the price of each item, unless there is a contract which fixes the price and shows what was to be furnished. But, even in the case of a contract, the contractor's books may be an important, if not vital, factor in proving the sum to which he is entitled, especially where the contractor has been prevented from completing performance of a lump sum contract.

State regulations

In many, if not most, states there are statutes that fix the conditions under which books of account will be received in court as proof of the correctness of charges.

When the books are produced in court some one knowing the facts must state under oath that the books represent a correct and complete record of the party's business dealings with the other party, that the entries were made by a certain person—who, if available, is the person usually called to identify the books and verify the charges—that the entries were made on the dates shown or thereabouts, etc. (Here is where the contractor needs to consult his local attorney to ascertain just how the books should be kept and just what must be proved in court to make entries legal evidence.)

Texas decision

The law established the rule that items of account can be proved by well-kept books as a matter of practical necessity. Otherwise, how could the corner grocer prove in court that Mrs. Jones bought 25¢ worth of carrots at one time a year or more before, and a dollar's worth of meat at another time.

But a decision lately reached by the Texas Court of Civil Appeals, in El Paso, shows that if a memorandum has been jotted down on a piece of paper, a contractor may use it to refresh his memory and

(Continued on page 101)

Effective cooling demonstration

◆ INVESTING $2,500 in a custom built trailer which permits pumping of cooled air through a canvas duct, into the prospect's house, is a merchandising innovation which has spelled profits at a record figure for Gilmore Refrigeration Service, Inc., in Pensacola, Florida.

The trailer was developed by Hugh E. Gilmore, head of the firm, both to demonstrate and sell package air conditioners "on the spot" as well as to promote heat-pump heating equipment, a field which, because of the low over-all operating costs, has glowing possibilities in the mild-climate of northern Florida.

"The principal obstacle in the path of merchandising residential air conditioning has always been the difficulty of demonstration," Mr. Gilmore said. "Showroom demonstration alone is not enough. Even though the prospect is cool and comfortable in the showroom, and figures prove conclusively that the same sort of comfort can be produced in his home, there is still a mental disassociation between showroom and home which is difficult to overcome. Most home owners are inherently skeptical over the possibilities of cooling or heating their dwellings at low cost, and consequently, it has been up to us to bridge the gap."

A complete heat pump installation on a 2-wheel trailer, equipped with a flexible canvas tube, enables Gilmore Refrigeration Service, of Pensacola, Fla., to give a convincing demonstration of cooling or heating by pumping conditioned air directly into prospect's rooms.

Trailer built locally

The trailer demonstrator proved to be the ideal solution. Built by a local auto body shop to Mr. Gilmore's specifications, the trailer is 8 feet long, 6 feet wide, and stands 4½ feet high at the sides. Space is provided in the bed for either a package air conditioner of from one to three ton size, or a complete heat pump unit, which stands erect at the rear.

A 12-inch canvas duct, actually a huge tube, with extensions, makes it possible for the salesman using the trailer equipment, to park alongside a home, business office, clinic building, etc., and use a series of adjustable screens to form a "grill" in the window through which the cooled air can move. Other equipment includes a tool box for necessary parts and accessories, spare tire, a dolly on which the trailer can be leveled for best operation of the equipment, etc.

As a "rolling billboard," in continuous use throughout the Pensacola area, the trailer has been responsible for bringing Gilmore many new prospects through the year.

24-hour demonstration

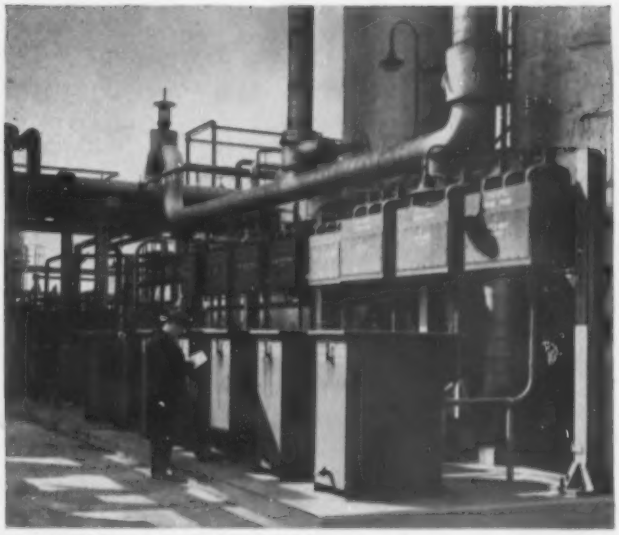
Standard procedure is to make an appointment with the prospect to demonstrate the cooling capacity of the suggested unit over a period long enough to demonstrate its complete reliability. Usually 24 hours are required. Since the least which the prospect can get out of it is a cool night's sleep during the hot summer months, demonstrations are always eagerly awaited. There are very few instances, Mr. Gilmore proudly relates, in which the prospect fails to sign on the dotted line, the following day.

Out in everyday service, the trailer unit has shown itself particularly effective in merchandising package air conditioning units and heating equipment to business buildings, because as Mr. Gilmore has found, the merchant who invests in a cooling system is one of the first to recognize the direct relationship which it has on his sales and profits.

During the past fall and winter, Mr. Gilmore has put a lot of promotion into heat pump residential and commercial heating, and the trailer is applied to the sales problem in precisely the same manner The Florida dealer plays up the economy feature heavily in the promotion of heat pump "comfort engineering," pointing out that in the Pensacola area, a heat pump will cool a three bedroom house of around 1,500 square feet during the summer, and heat it during the

(Continued on page 101)

COMPLETE LINE of G-E oil-filled cutouts includes pole, pothead and subway types and metal-enclosed assemblies.



INDUSTRIALS, such as this oil refinery, use these three-phase metal-enclosed G-E oil-filled cutout assemblies to protect equipment.

UTILITIES with underground systems use G-E oil-filled subway-type cutouts for single phase or three phase, gang-operated, fusing or switching. Expansion chambers are required to secure full interrupting rating.

For best in low-cost switching...industrials, electric utilities choose G-E oil-filled cutouts

Indoors or outdoors, they permit substantial savings on first cost and fuse replacement—combine high interrupting capacity, safer operation and long life

For utility, industrial, commercial and institutional applications that combine overcurrent protection and load-break switching, more and more companies are choosing General Electric oil filled cutouts.

HERE'S WHY: Low-cost G-E oil-filled cutouts provide high interrupting capacity . . . up to 11,000 rms amperes. They provide for maximum safety of personnel . . . all arcing occurs under oil and all flame, noise and electrically live parts are confined within a metal housing. And G-E oil-filled cutouts offer long service life since interrupting ratings are based on test conditions far more severe than those normally encountered in operation.

IDEAL INDOORS OR OUTDOORS G-E oil-filled cutouts are quiet in operation, and they may be wall or direct-to-equipment mounted. Single- or three-phase metal-enclosed assemblies provide for all wiring and electrical connections to be completely enclosed in a grounded steel cabinet. Entrances can be provided for connection to outgoing cables.

Other G-E oil-filled cutout features include:

- Simple fusing, even on gang-operated assemblies. Preformed fuse links easily slip into place.
- Silver-plated self-aligning contacts of heavy forged copper with special arcing tips . . . minimize wear.
- Leads brought into cutout housing above oil level—no gasketed joints under oil pressure.
- Pole and pothead types do not require expansion chamber for full interrupting capacity.

If you have an application that requires overcurrent protection *plus* load-break switching, it will pay you to investigate G-E oil-filled cutouts. Available for 2400-, 4330- and 7200-volt circuits, they can mean substantial savings in initial costs and fuse replacements.

For complete information, contact your nearest G-E Apparatus Sales Representative, or write for bulletin GEC-863, General Electric Company, Schenectady 5, N. Y. 413-12

Progress Is Our Most Important Product

GENERAL ELECTRIC

new! VIRDEN fluorescent fixtures assemble in ⅓ the time

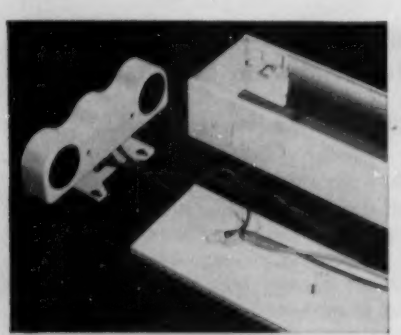
Think of the savings this new improvement in fixture assembly can mean to you. Now you can get and do more jobs—faster.

As shown on the opposite page, lights were fastened to the man's wrists so we could chart the motions needed to assemble the new Virden fixtures and the old-fashioned kind. The pictures show how the new Virden method is smooth and with many fewer motions than the old-fashioned way.

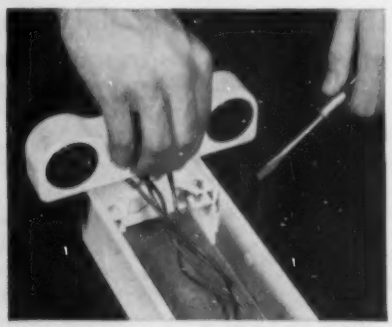
No bag of parts. In just a few minutes, a four-foot fluorescent fixture is ready to be put on the ceiling. No screws to sort out and fit . . . all screws are pre-set, need only tightening. With the Virden system, all the parts fit with a quick click and a turn of the wrist.

Another important feature of these new fixtures is shielding that can be hinged on either side for easy maintenance.

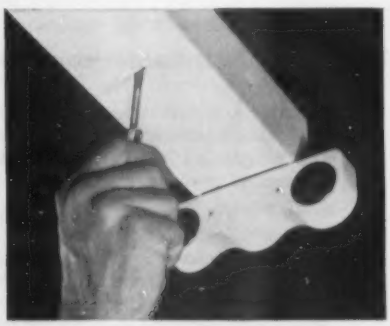
These same time-saving features are on *all* Virden strip, fluorescent and slimline units. Your nearby Virden distributor will show you all these advantages in detail. Next time you need fluorescent fixtures, ask for Virden and see how they make your job quicker, easier, and more profitable. *John C. Virden Co., Dept. ES-4, 6103 Longfellow Avenue, Cleveland 3, Ohio.*



These are all the parts you need to assemble the new Virden fixture. The channel, the sockets and the cover—*no bag of parts.*

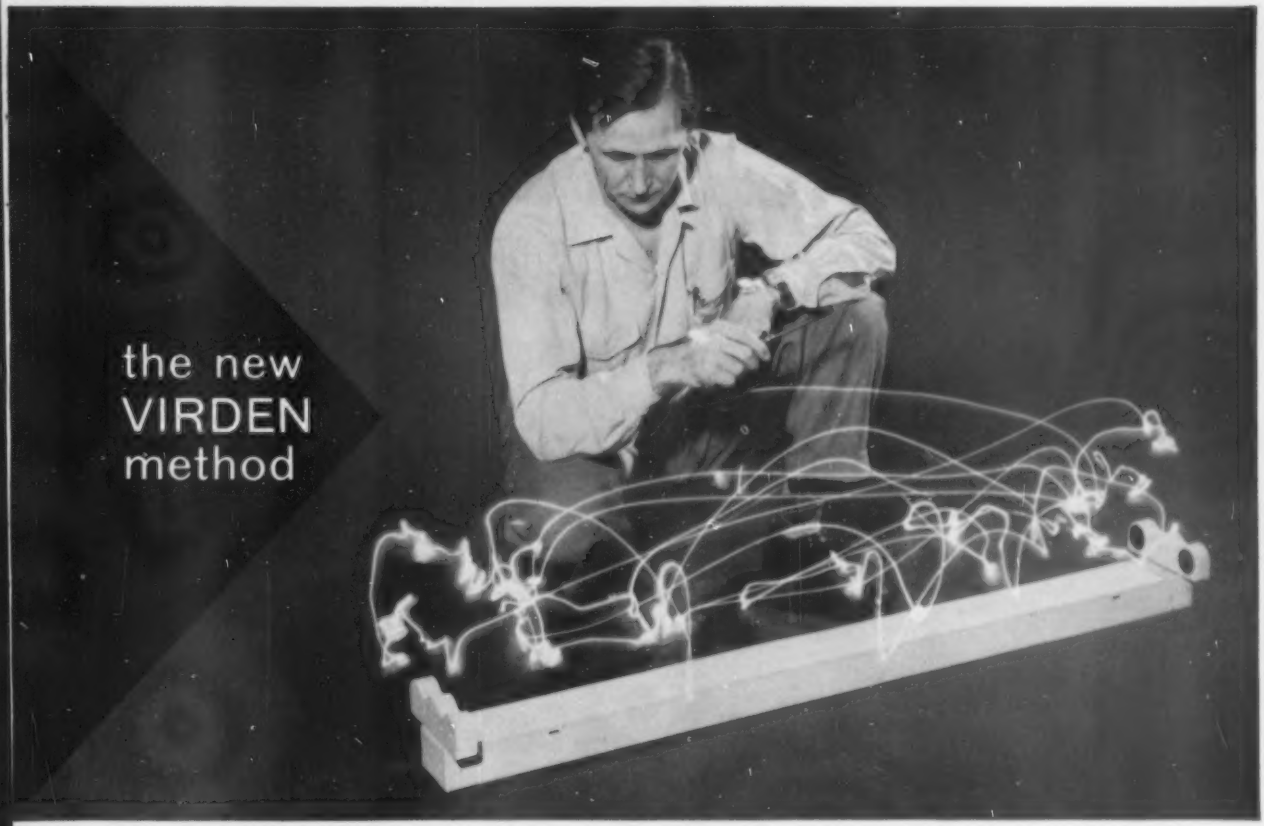


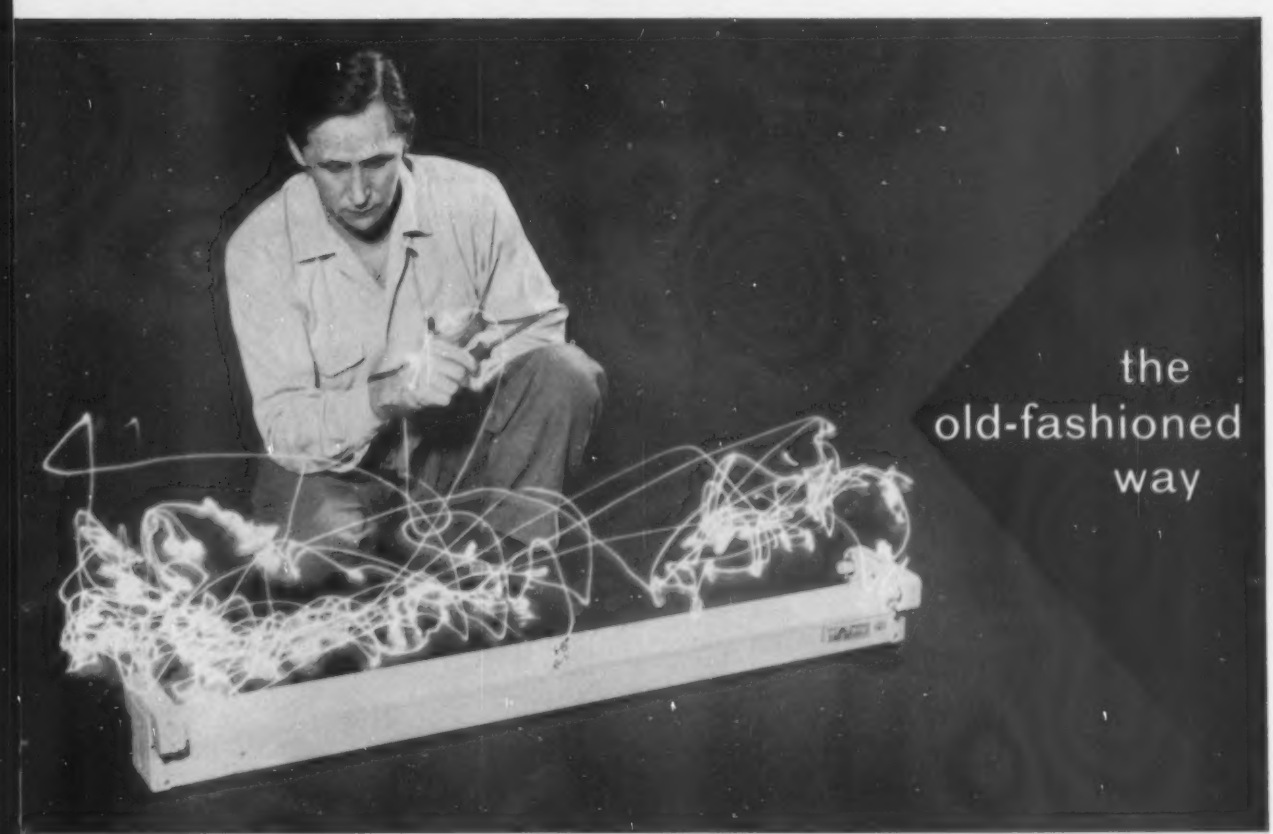
Slip the sockets over the pre-set screws and tighten securely. You are now ready to install the fixture on the ceiling.



When the fixture is mounted, put the cover on, slip the screwdriver in the notch, and give ¼ turn. *In 45 seconds,* everything's assembled.

decorative lighting by virden


the new
VIRDEN
method


the
old-fashioned
way

Mediation Board settles disputes between owners and contractors

◆ LIKE MANY OTHER forward-looking cities, New Orleans, Louisiana, has a program aimed at rehabilitating "blighted" slum areas and making them, though still in the hands of their private owners, better places in which to live as well as better producers of tax money. In most cities wheer this type of semi-forced rehabilitation exists, many disputes arise between owners and contractors. Unlike what happens in other cities, few of these disputes reach the courts in New Orleans.

The reason is a Mediation Board, set up experimentally as a part of the city Division of Housing Improvement. The Board consists of one paid member (an attorney) with a staff member from the Housing Improvement Division and a member from a Citizens Advisory Committee.

Board applies pressure

If contractor and owner don't agree, the Board can't force them to go by its ruling, but in practice they always do. For in extra-legal ways, the Board can apply pressure. Fly-by-night contractors who act unethically can be taken off the approved list. Nobody insists that property owners call only upon firms named in this list, but they do, and so de-listing is a powerful threat. Dishonest property owners can be placed under other pressures from co-operating business groups.

In practice, as many complaints arise in which contractors are the complaining parties as those in which owners bring charges. There was, for example, the property owner who was called upto to do certain work. He deliberately withheld from the contractor's estimator vital information which would have lled to additiona charges. The conditions were uncovered as work progressed and the contractor approached the owner with a request to renegotiate the price in view of changed conditions. "Nothing doing," the property owner grinned. "You agreed, now you go ahead."

"We found for the contractor," said Vernon R. Daste, assistant chief of the Housing Improvement Division, "but we gave him a lecture, too, not to take anything for granted in the future. He is a new operator. An experienced man wouldn't have allowed his estimator to take anything on trust like that."

Practical example

In another case, a shoestrong contractor had secured a number of contracts, each of which he jobbed out to local journeymen. "He subcontracted less work than he had contracted originally to do," Daste says, "and when homeowners and owners of rental property complained, they complained to the subs—who had done all they agreed to do, and who besides were responsible to this shoestring 'general', not to the owners. It was a mess, but we obtained fair adjustment for the owners and the orig-

(Continued on page 101)

Col. S. P. Hubbard (seated) and V. R. Daste, respectively chief and assistant chief of the rehabilitation program in New Orleans.

These hearings have no legal authority. However, in actual practice both parties usually comply with the Division's findings.

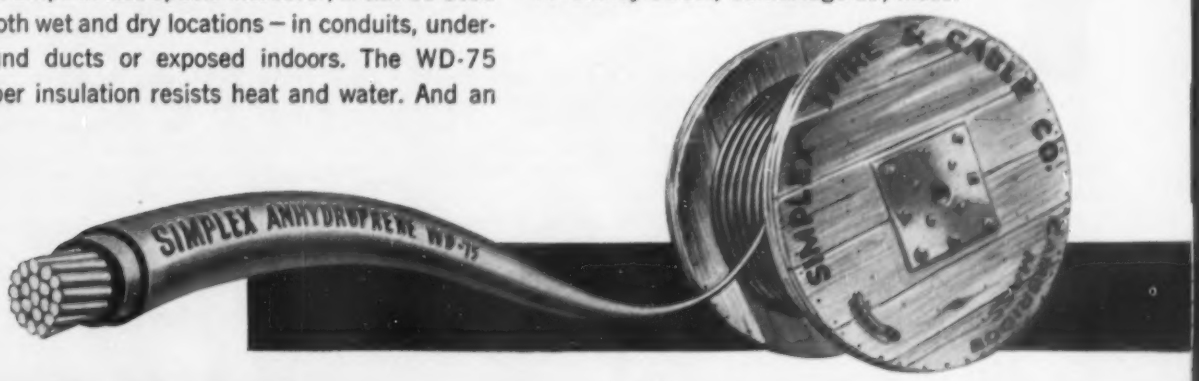
ELECTRICAL CONTRACTOR: Walter J. Barnes Electric Co., New Orleans, La. ENGINEERS: Palmer & Baker, Inc., Mobile, Alabama

Nearly 50 miles of ANHYDROPRENE WD-75 . . . pushing more power through less space!

ANHYDROPRENE WD-75, Simplex's general-purpose cable, is now being used in two great Southern construction projects: Louisiana's new Belle Chasse and Harvey Tunnels.

Made for 600-volt service, ANHYDROPRENE WD-75 was chosen because it squeezes through more amps in less space. Moreover, it can be used in both wet and dry locations – in conduits, underground ducts or exposed indoors. The WD-75 rubber insulation resists heat and water. And an exclusive Simplex compound makes its neoprene jacket extra tough.

Specify ANHYDROPRENE WD-75 wherever you need maximum power. These wires are available in many colors in most standard sizes. Write for Booklet No. 1018. **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Mass.



Case histories in labor relations

How would you have handled these labor grievances?

This roundup of day-to-day problems in labor relations provides an opportunity to test your judgment as to what is right and wrong. Each incident is an actual grievance that went to arbitration. Names have been changed for obvious reasons, but readers may obtain actual citations on any specific case by writing to the editor.

Acts of carelessness

When can't you demote an employee who has been guilty of four acts of carelessness?

What happened

After four warnings, Daniel Moriarty was demoted from a job paying $1.81 an hour to a job in the $1.56 an hour classification. The company gave as its reason: on four occasions within the past two years, Moriarty had to be warned by his foreman for "careless workmanship." On each occasion a warning slip was put into his personnel file. In fact, after the third warning, he was told that "one more slip-up and he would be demoted." So, when the issue came to arbitration the company said in defense:

1. Dan had been warned of what's coming so he had ample notice to improve "or else."

2. He can't do the job adequately, as witness the four warning slips in his file.

3. We are doing this for Dan's own good—demoting him to a job he could do, instead of firing him for incompetence.

4. As management we have a duty to run our business efficiently and if a man isn't working out, we have the power and authority to change his job.

Dan wasn't convinced, and he used a little arithmetic to try to convince the arbitrator:

(a) I don't deny the four warnings of carelessness.

(b) But the penalty is far too severe. Look at it this way. If I'm demoted I lose 25¢ an hour. So in every eight weeks I lost one week's pay. At the end of a year I'm out seven weeks' money. Isn't that too much of a price to pay for carelessness which warranted only a warning notice? If management thought my errors were so bad, how come I wasn't given a real penalty, like a layoff or finally a discharge? So my mistakes couldn't have been *that* serious.

(c) And finally, demotion is no way to penalize a worker for such minor offenses. Demotion should only be used when there is a lay-off—not as a disciplinary device.

Was Dan: Right ☐ Wrong ☐

What arbitrator ruled: "The grievant's employment file shows that four warnings were given him during the past two years. There is no lay-off penalty in the record. The demotion following the current (fourth) offense resulted in a reduction in pay from $1.81 per hour to $1.56 per hour, or a loss of 25¢ per hour—forever. Thus in every eight weeks the grievant loses more than the equivalent of one week's pay at his old job.

"In view of the fact that previous offenses, some of them of a similar nature to the most recent offense, resulted merely in warnings, the heavy financial penalty resulting from the demotion (if viewed as a disciplinary action) is excessive. Progressively heavier penalties should be used in disciplinary action where essentially similar offenses are involved. To go from a warning without financial penalty to a heavy financial penalty representing more than one week's pay in eight does not meet the standards of disciplinary action.

"The grievant had received three warnings without penalty prior to the latest offense. A penalty lay-off is unquestionably warranted. The question remains: how severe a penalty should be imposed? On the principle of progressive discipline for similar offenses, the fact that there was no penalty associated with the prior disciplinary actions must be given considerable weight. Discharge would be grossly excessive: a mere warning without penalty would be inadequate. A one-week penalty lay-off would be a reasonable disciplinary action under all the facts and circumstances of this case."

Dozing on the job

Can you fire an employee for dozing on the job if his action doesn't interfere with production?

What happened

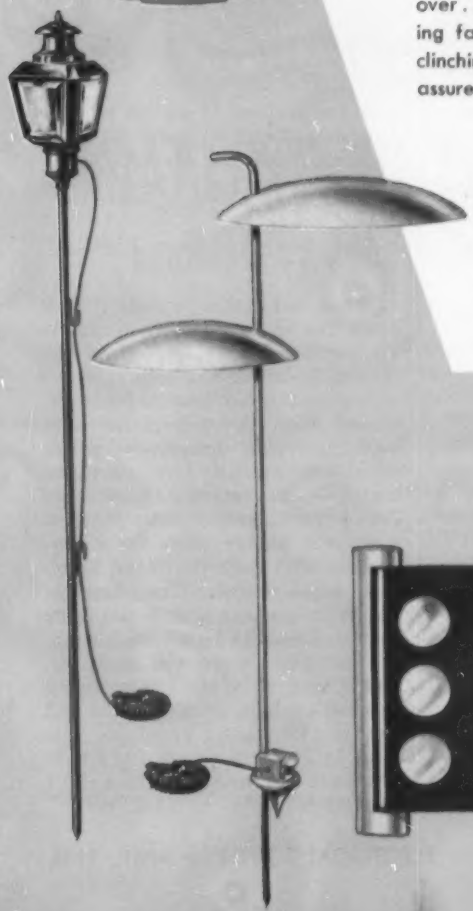
E. Walter Treadway was a fixer—a machine fixer, that is. He had no stationary job. Whenever a machine needed adjustment or repair in his department, it was his responsibility to put it in running order.

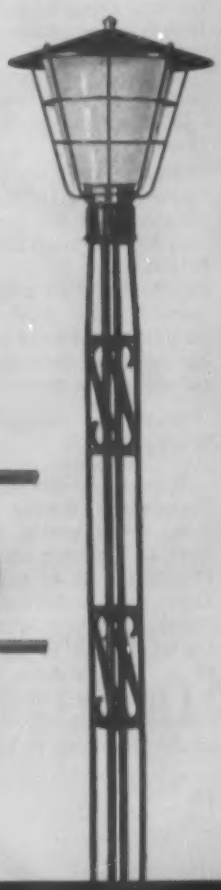
One afternoon, there was nothing much to do, the machines were humming nicely, so he drew up a couple of chairs, stretched out, slid his work cap over his eyes and began to snooze. This wasn't the first time he had done this. It was a rather common practice, and management did nothing about it except on rare occasions when the supervisor would gently poke Treadway and shake his head.

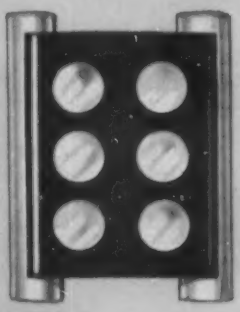
progress

The ONE line that excels in Profit Extras

Here's the line that's a real business-builder. Long identified as the maker of the finest in lighting fixtures, PROGRESS carries with it the reputation for top quality at rock-bottom prices. Just as Progress' tremendous selection of indoor and outdoor lighting fixtures means fast turnover . . . so Progress' sensational line of ventilating fans and door chimes offers greater sales-clinching opportunities. That's why PROGRESS assures greater profit!







PROGRESS
MANUFACTURING CO., INC.
PHILADELPHIA 34, PA.

This particular afternoon, however, when Treadway opened his eyes, there was a discharge slip staring him in the face. Treadway, a 15-year man, immediately filed a grievance, and when management stood by its decision, the situation went to arbitration. Treadway put up this defense:

1. His dozing did not interfere with production. His job was to "be on call" and he *didn't* have to *do that* with his eyes open.

2. Dozing was always tolerated by management. Even production workers who tended machines took naps during rest periods.

3. There was no written rule against sleeping.

4. No one previously had been fired for taking forty winks during working hours.

The company wasn't convinced. It brought forth these arguments:

1. Whether it had a written rule or not, sleeping on the job could never be considered an employee "right" in any industry.

2. Treadway had been warned several times by his supervisor.

3. A management had a right to start enforcing its rules anytime. even though in the past it had been rather amiss in seeing that employees "toe the line."

4. Even though Treadway had no actual work to do, he should stay awake for two reasons — (1) it doesn't look good if other employees see him sleeping, and (2) he should be alert for significant noises in the machines.

Was the company: Right ☐ Wrong ☐

What arbitrator ruled: "If Treadway's dozing had been his first, there would not have been 'just and proper cause,' under the circumstances of this case, for his discharge. He did not doze when he should have been working actively; his work was 'caught up' and had been properly done. His dozing did not create a risk of damage to company property. His only duty at the time was to be on hand and wait until his services were needed. I have found that his dozing was not incompatible with his full performance of that task.

"On the other hand, I hold that under the authority to direct its working forces, the company had the right to adopt and enforce a rule prohibiting a worker from 'sleeping on the job' even when his job was 'caught up.' Such a rule would be reasonable because if some workers slept in situations where sleeping was compatible with full performance of their jobs, there would be a risk that other workers whose jobs required at least partial alertness even during periods of fatigue time might follow the example thus set.

"But to make discharge a proper and just penalty for violation of such a rule, fairness requires at least that the rule be unequivocally adopted by the company and that its existence be brought home to the workers.

"Here Treadway had been warned. But the rule had not been unequivocally adopted or adequately publicized or uniformly and energetically enforced. The company had given Treadway oral warnings on the occasions of previous offenses but had not informed him that the warnings were being noted in his record and most of them were not so recorded.

"I conclude that discharge was too severe a penalty for what Treadway did. There would have been just and proper cause, under the circumstances, for suspending him for several months without pay. Accordingly, I award that he be reinstated without loss of seniority but without back pay."

Layoff problem

If during a layoff an employee has an accident and becomes handicapped, can you refuse to rehire him?

What happened

When business took a turn for the worse, the company laid off 20 workers. It was done on the basis of seniority. Louis Putzel was one of the employees who was let go. Three months later, when business improved, Lou was recalled. However, he had to take a physical examination before going back on the payroll. This was company policy—anyone absent for 30 days or more for any reason must go through a "medical."

When Lou was examined, he told the doctor he had lost the vision in one eye. It seems that during the layoff, Lou had an accident, and it affected his sight. The company refused to rehire him because he didn't meet the necessary physical conditions for employment. Lou invoked the grievance procedure.

To the arbitrator, the company put forth the following arguments:

1. We do not hire anyone with sight in only one eye. In fact, our records show that we have turned down ten new applicants in the last month because of poor vision.

2. While Lou's work does not require perfect vision, there are many hazards around the plant and he might get hurt.

3. We don't like to do this but we cannot make an exception.

4. The company has a right to set up reasonable standards of physical health for its employees.

Lou challenged this position:

1. I am not a new employee and therefore the health rules for new applicants don't apply to me.

2. There are people working in the plant with defective sight or sight in only one eye. Why aren't they let go?

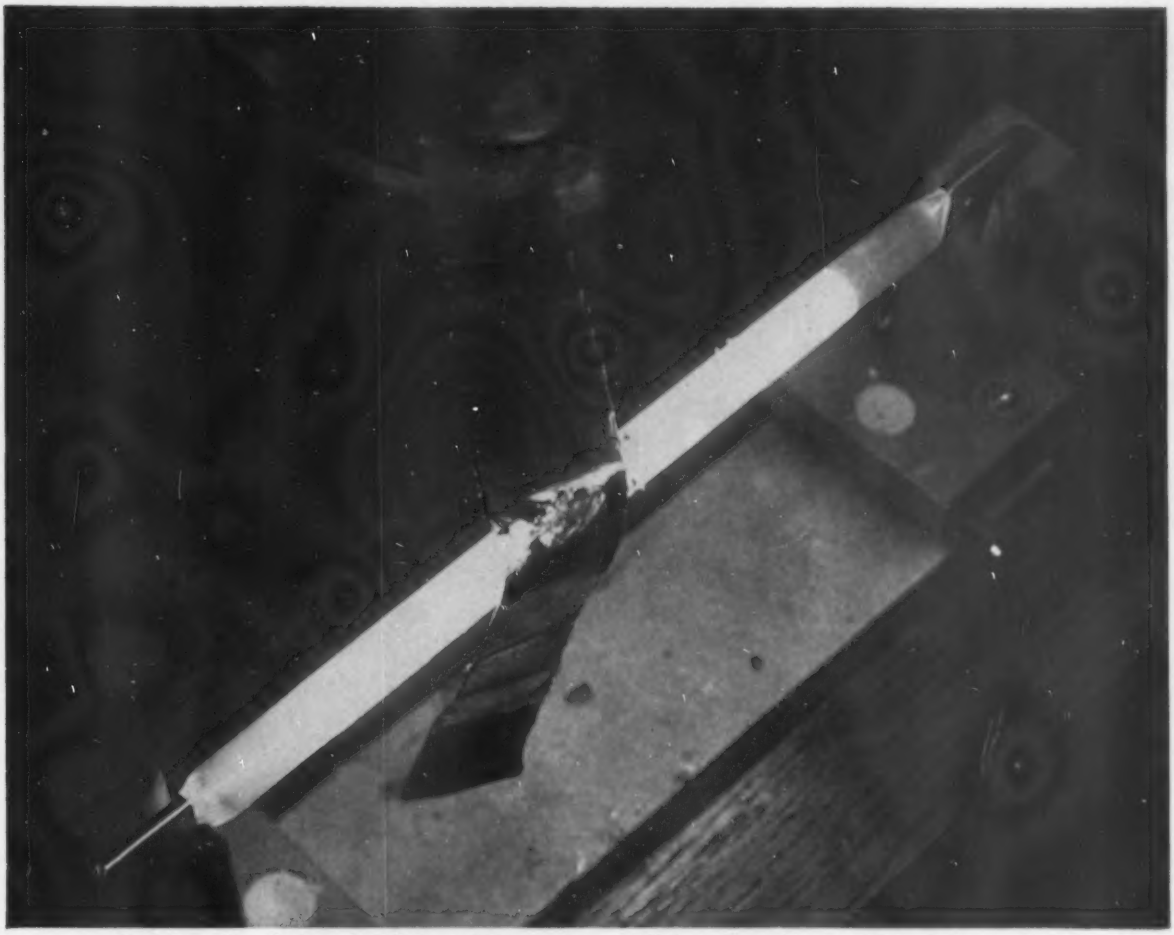
3. My job doesn't require the sight of two eyes. I've been in the plant for three years so I won't get hurt through hazards because of my poor vision.

4. I'm entitled to my job back on the basis of seniority and that's the only standard that should count.

5. I've been a good employee as your records will show.

Was the employee: Right ☐ Wrong ☐

What arbitrator ruled: "It is clear that the company refused reemployment to Mr. Putzel, a laid off employee for a condition which would not have justified his removal from the job if he were working. The company's policy does not contain any provision which would require employees recalled from layoff to meet physical standards *higher* than those employees who have continued in active employment. The loss of vision in one eye would not have been sufficient to terminate his employment had he been at work. Mr. Putzel was on layoff. His seniority was not broken. To all intents and purposes he was an 'employee.' He is not in the same position of a new applicant. He therefore has a right to his job."



Shown here melting aluminum, the G-E Quartz infra-red lamp can provide heat concentrations up to 1000 watts per square inch.

SMALLEST, HOTTEST, FASTEST electrical heat source available . . . the new General Electric Quartz infra-red lamp

Here's a lamp you can recommend where a powerful compact heat source is required

Heat concentrations 20 times that delivered by previous infra-red sources are possible with the new G-E Quartz infra-red lamp. Hot enough to melt aluminum! So rugged it won't crack under ice water when it's red hot! Entirely new uses are foreseen for this extremely powerful and compact energy source. Bulky equipment can be reduced in size. Here are but a few of many applications in a wide variety of fields where the new G-E Quartz infra-red is already being used:

INDUSTRY—Because of the lamp's extremely fast warm-up, and its compactness, it is being used by manufacturers to heat gears and other metal parts for shrink fitting. In textile mills it is used to speed drying operations, thus contributing to increased productivity.

CAFETERIAS—Where food has to be heated rapidly for large groups—such as in plant cafeterias—the G-E Quartz infra-red can clear bottle-necks by speeding service.

LABORATORIES—Several major aircraft laboratories are using the G-E Quartz infra-red to simulate the heat produced on aircraft surfaces by supersonic flight.

OFFICES—The high concentration of heat from the G-E Quartz infra-red has been responsible for the development of a more compact duplicating machine that provides sharp reproduction, simply and in a matter of seconds.

For your customers who are looking for a truly powerful source of heat or infra-red energy, you can suggest the General Electric Quartz infra-red with full assurance that you are recommending one of the most reliable and versatile tools available today.

For more information write General Electric Large Lamp Dept. **ES-4**, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

read all about it!
HOLAN
ALL-HYDRAULIC LADDER
The last word in ladders. Every movement of Holan's 2100 Ladder is controlled hydraulically. It rotates 360° . . . reaches up to 40 feet in the air . . . elevates to a 75° elevation.
Write for the new 2100 catalog for technical information

J.H. HOLAN CORPORATION
4100 WEST 150TH STREET
CLEVELAND 11, OHIO
OTHER PLANTS: GRIFFIN, GA.; PHOENIX, ARIZONA; BRANTFORD, ONTARIO

To: J. H. Holan Corporation
4100 West 150th Street
Cleveland 11, Ohio

Please send me the factual technical bulletin about Holan's 2100 Hydraulic Ladder.

Name_____ Title_____

Address_____

City_____ Zone_____ State_____

THIS IS BRAND NEW!

the ELECTRICAL SOUTH

DIRECTORY

of

ELECTRICAL MANUFACTURERS and their SOUTHERN and SOUTHWESTERN REPRESENTATIVES

1956 EDITION

PRICE $2.50

Enthusiastic letters from Directory users confirm earlier survey reports stressing need for this type of information. The supply is limited.

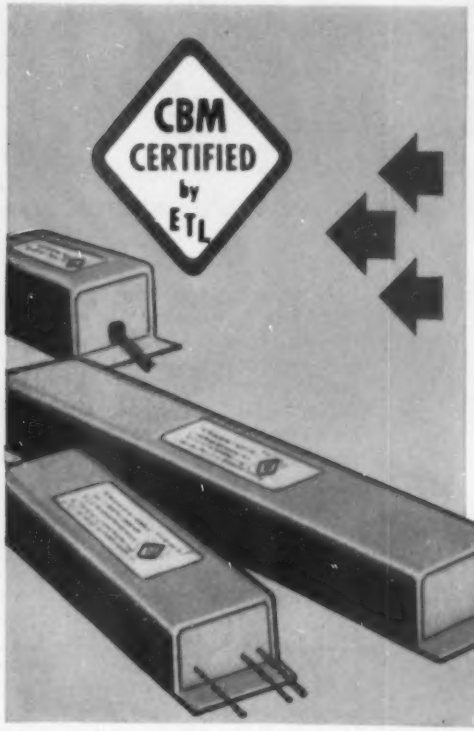
ORDER YOUR COPY NOW.

Available at $2.50 per copy.

ELECTRICAL SOUTH

806 Peachtree Street, N. E.

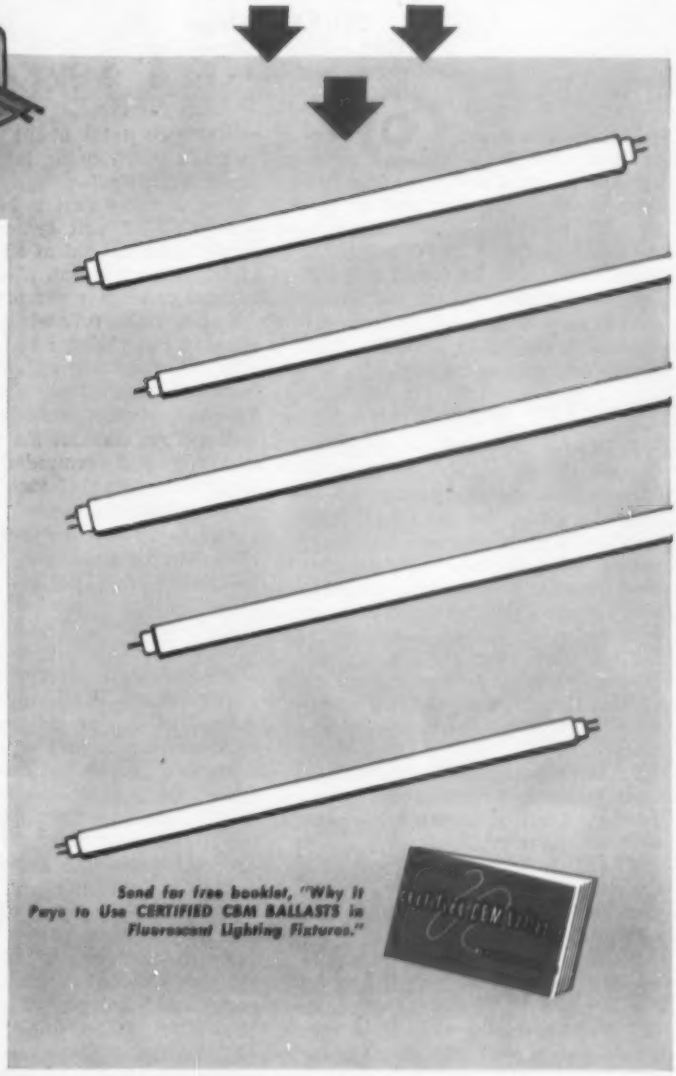
Atlanta 8, Georgia



CERTIFIED CBM BALLASTS

...give you more economical Fluorescent Lighting

because they are "Tailored to the Tube"



Every type and size of fluorescent tube has its own specific electrical requirements. Thus, to get ideal performance and lighting economy, it is essential that the ballasts provide precisely the electrical needs of the tubes they operate.

CERTIFIED CBM BALLASTS are "Tailored to the Tube." Built to exacting specifications, then tested and checked by ETL, an independent agency, CERTIFIED CBM BALLASTS are a dependable assurance of both satisfactory and economical fluorescent lighting.

Certified CBM Ballasts

PROVIDE:

LONG BALLAST LIFE
FULL LIGHT OUTPUT
LONG LAMP LIFE
TROUBLE-FREE OPERATION

all of which contribute to easier maintenance and fluorescent lighting economy.

Eight of the country's leading manufacturers of ballasts make CERTIFIED CBM BALLASTS. Participation in CBM is open to any manufacturer who wishes to qualify.

Send for free booklet, "Why It Pays to Use CERTIFIED CBM BALLASTS in Fluorescent Lighting Fixtures."

CERTIFIED BALLAST MANUFACTURERS
2116 KEITH BLDG., CLEVELAND 15, OHIO

Maintenance engineers' notebook

Code questions and answers for industrial electricians

by Robert U. Garrett
Chief Electrician
Oerlikon Tool & Arms Corp.
Asheville, N. C.

◆ THESE QUESTIONS, based on experience and the National Electrical Code, were developed to determine the qualifications of applicants for the position of journeyman electrican in an industrial plant. They will be found helpful, too, as a check list for industrial electricians to test themselves and determine the fields in which additional study is necessary.

Test questions

1. Define the terms: Accessible; Branch Circuit; Cabinet; Device; Circuit Breaker; Hazardous Location; Raceway; Service Conductor; Service Entrance Conducter; Over-load Device; Dust-tight; Dust-proof; Vapor-tight; Explosion-proof; Hoist-way; Feeder; Guarded.

2. Explain the difference between "service ground," "equipment ground" and the maintenance term "grounded line" (or circuit).

3. Under what conditions may an un-insulated current carry conductor be pulled in the same pipe with insulated conductors?

4. (a) In a multiphase wiring system, which conductor would you identify? (b) Which one would you ground?

5. In a service conduit run it is necessary to cut in a pull box or use a piece of flex-steel conduit. (a) What special provision, if any, would you make? (b) Would you splice the conductors?

6. (a) On voltages above 250 volts to the ground, in a conduit system, what precautions, if any, would you take about locknuts? (b) On #4 wire or larger, what about bushings?

7. Assuming that a 3-phase, 4-wire 480/277 volt system is perfectly balanced out at 50 amps per phase, what current, if any, is the neutral conductor carrying? Why?

8. Draw the following diagrams roughly but plainly:

(a) Connect three transformers from a 3-phase, 3-wire primary to a 3-phase, 3-wire secondary, Delta-Delta. Now, connect the secondary in Wye and grounded neutral. What difference, if any, occurs in the secondary voltage?

(b) Control a single phase current carrying device (assuming 120 volts) from four points.

(c) Using "Start-Stop" push button stations, control a motor through a magnetic starter from three points. Show operating coil.

(d) Now, assuming that the starter is of a magnetic-reversing type, start, stop and reverse, show control from two points. Show operating coils only.

(e) Connect a 120 volt voltmeter to a 480 volt line through the proper transformer and name it.

(f) Connect an ammeter to this same line through the proper transformer and name it.

9. In a 3-phase, 3-wire ungrounded Delta system in conduit, one phase breaks down to the pipe. (a) What, if anything, happens? (b) Assuming this system is Wye connected secondary and midpoint grounded at transformer, and the breakdown occurs, what, if anything, happens?

10. State for what purposes the following are used: (a) Autotransformer; (b) Ignition transformer; (c) Constant - current transformer; (d) Load balancing transformer; (e) Phase changing transformer. (f) Can you convert from 2-phase to 3-phase through a transformer bank?

11. How many classes and divisions does the Code list for Hazardous Locations? Describe very briefly the atmospheres and operation conditions covered by Article 500.

12. (a) What is meant by a motor "single phasing"; (b) What type of motor "goes hunting" occasionally? (c) How would you remedy such a condition?

13. What instrument, commonly used industrially, would you probably use to periodically check the condition of motors and wiring systems?

14. Name three of the most common methods of changing the speed of an induction type motor.

15. (a) Describe briefly the difference between an Ammeter and a Wattmeter. (b) Very simply stated, just what is "Power Factor"? (c) What two generally accepted methods are used industrially to correct a low P.F. condition?

16. (a) In a routine inspection of a group of motors, what three things would you check for while motors are in operation? (b) What is commonly known as a "Tong-test" instrument? (c) What is one of the most commonly used testing devices in routine work?

17. Where and under what conditions does the Code require that a switch or other disconnecting means be put in the grounded side of a single phase 2-wire branch circuit?

18. (a) Briefly, what is a polyphase circuit? (b) How would you go about balancing out? (c) Assuming a single phase, 3-wire, 115/230 volt system is out of balance by a 200 watt lamp on one side and a 25 watt lamp on the other side. The neutral wire is opened. What condition results and

1 **"INCH-MARKED"** Length of tube is marked in feet and inches on all popular sizes. Eliminates problem of laying flat rule on round surface. Also by aligning proper marks on tube with calibrations on the Republic Bender, it's easy to obtain exactly the right height of bend.

2 **"GUIDE LINED"** Extends full length of tubing. By lining up with arrows on Republic Bender, it is easy to help keep bends in the correct plane, avoid costly "wows." With Guide Line and "Inch-Marks," accurate, properly located bends are easy to make—every time. On all popular sizes.

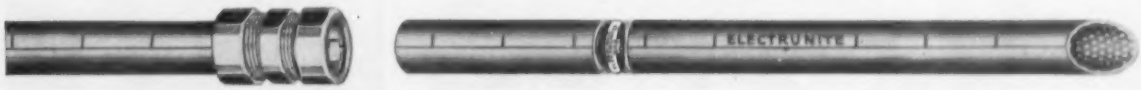
2 EXCLUSIVE FEATURES that make Republic ELECTRUNITE E.M.T. easier to install

Inside Knurling makes wire-pulling easier, too!
Another exclusive feature available on all popular sizes. Republic's exclusive ball-bearing inside surface is the secret. Makes wire-pulling up to 30 per cent easier.

• Thanks to these highly popular features, electrical contractors all over the country are using more and more Republic ELECTRUNITE® Electrical Metallic Tubing in all types of installations. They like the ease of installation—the good results—the savings in time and tubing.

Ductile, smooth-bending, top-quality Republic E.M.T. makes it easy to meet schedules for any type of construction. It's 100% approved for concrete-slab construction by the National Electrical Code.

On your next job, regardless of size, you can reduce waste and costs by installing Republic ELECTRUNITE "Inch-Marked" E.M.T. When ordering from your electrical distributor just ask for Republic—the E.M.T. that's "Inch-Marked"® and "Guide Lined." Send coupon for literature providing complete information.



REPUBLIC STEEL
STEEL AND TUBES DIVISION

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
Dept. C-1635A
227 East 131st Street • Cleveland 8, Ohio
Please send me literature on Republic ELECTRUNITE "Inch-Marked" E.M.T.

Name _____ Title _____

Company _____

Address _____

City _____ Zone ____ State _____

THE LIGHTING SYSTEM THAT
goes together on the floor

...and saves 50% on Installation costs

The new Gibson ORTHO Fixtures mount on a special channel called the UNI-RACE. In the photo above, the telescoping sections of the UNI-RACE are being assembled on the floor in a matter of minutes. The receptacles which come with each 4-foot section are connected as shown in the inset. The light but rigid UNI-RACE in 24′ to 48′ lengths is easily lifted and hung directly on joists, beams or stems. The fixtures simply snap into place on the UNI-RACE which holds them in perfect alignment.

An easier, faster and far better job! Is it any wonder that contractors report savings of more than 50% in labor and materials on Gibson ORTHO Installations?

Wouldn't you like more information about this totally new concept in industrial and commercial lighting design? Drop us a line today. We'll send you the whole story.

SNAP—IT'S UP • Connection is made through a built-in plug in the fixture which engages the receptacle in the UNI-RACE. Any fixture may be put up or taken down at will without interrupting other fixtures on the circuit.

VARIABLE SPACING • ORTHO units may be mounted in continuous rows or spaced at intervals of 4, 8, 12 or more feet. Fixtures may be added, removed, and rearranged any time by one man without tools.

Model 77-424X

ortho-77 COMMERCIAL

Model 88-221X

ortho-88 INDUSTRIAL

Ⓟ AND PAT. PENDING

Gibson LIGHTING

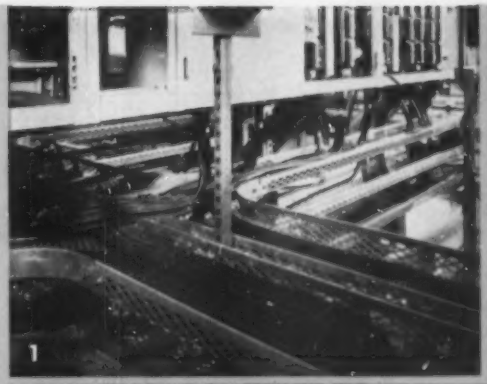
GIBSON Manufacturing Co.

1919 Piedmont Circle, N.E. — Atlanta 5, Georgia

1. RoMarine-RoPrene's light weight and smaller diameters make it ideal for trays, racks and other metal raceway installations.

2. RoMarine-RoPrene is easy to pull in manholes and conduit or duct runs.

3. RoMarine-RoPrene is all-resistant to the effects of burial directly in earth.



You can cut cable costs with this premium cable

Yes, it is true that in the long run it often costs less to buy the best. RoMarine-RoPrene power distribution cable proves it. It has an enviable performance record. In construction, it combines high quality RoMarine, heat- and moisture-resistant rubber insulation, with the ruggedness of RoPrene (Neoprene) sheath. Economy results not only from its dependability but from its versatility, as well. RoMarine-RoPrene is one cable that can be installed aerially, in ducts and conduits, buried directly in earth or in runs combining all three. Widely accepted for power-distribution circuits, there are many instances where it becomes a money-saving building wire. It costs but little more than the cheapest . . . yet more than makes up the difference with long life and electrical stability.

How you save

Compared with cables having metallic coverings, RoMarine-RoPrene makes these economies possible:

- Lower original purchase cost
- Savings through reduced inventory
- Lower replacement costs*
- Less termination and splicing expense with fewer accessories.

You get these advantages:

- Exceptionally long service life
- Ease of terminating and splicing
- Light weight and smaller diameters
- No fibrous or other coverings to deteriorate
- Immunity to the effects of electrolysis, corrosion and temperature extremes
- High resistance to oils, acids, alkalies, moisture, abrasion, flame and weather.

Where you can use RoMarine-RoPrene®

Generally recommended for 600-volt service, RoMarine-RoPrene is ideal for a multiplicity of applications by electrical utilities, in industrial plants, for rural electrification, airport wiring and residential services.

It is specifically approved by Underwriters' Laboratories, Inc. as Type USE for underground service entrances.

It is approved by Civil Aeronautics Administration for airport wiring, when CAA Specification L-824, with Type A insulation, applies.

It has been proved a superior product for general purpose wiring and, except under circumstances of the National Electrical Code, can be unhesitatingly recommended for 75°C. operation.

It will pay you to check into the economy and serviceability of RoMarine-RoPrene power distribution cables. Detailed specifications and prices are yours for the asking. Write or phone today for Bulletin RR-2.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

what, if anything, happens to the lamps?

19. (a) Describe briefly a synchronous motor. What are its speed characteristics? (b) What, if any, additional equipment is required for its installation and operation other than that required for a squirrel cage motor?

20. To what other use, besides being adaptable to varying or variable speed operation, is the "slip-ring" motor sometimes put?

21. Assume you are called on a power failure and you find the main disconnect open. The far end of the circuit is out of sight of the disconnect. Would you (a) close the disconnect first and then begin locating the trouble or would you (b) check the entire line first and then begin looking for obvious trouble before closing disconnect?

22. When you open a disconnect to work on the line, what is the first thing you would think about or think of doing?

23. When you are issued a ladder or rope fall from the tool crib, what is the first thing you would do, assuming you are even in a hurry?

24. When it is necessary to work in a close space with live parts exposed, what precaution for your own personal safety would you take?

25. Explain in detail what procedure you would take when (a) a person is in contact with a hot line and (b) a person is unconscious from electric shock. Explain step by step your procedure.

Answers to questions

1. **Accessible:** Not permanently closed in by structure or finish of building; capable of being removed without disturbing building structure or finish.

Branch Circuit: That portion of a wiring system extending beyond the final overcurrent device protecting the circuit.

Cabinet: An enclosure designed for either surface or flush mounting and provided with a frame, matt or trim in which doors are hung.

Device: A unit of an electrical system which is intended to carry, but not consume, electrical energy.

Circuit Breaker: A device designed to open under abnormal conditions as a current-carrying circuit without injury to itself.

Hazardous Location: That area, building or premises in which the authority enforcing the National Electric Code considers to be covered by or included in Article 500.

Raceway: Any channel for holding wires, cables, or bus-bars, which is designed expressly for, and used solely for, this purpose.

Service Conductor: That portion of the supply conductors which extends from the street main or duct or transformers to the service equipment of the premises supplied.

Service Entrance Conductor: That portion of service conductors between the terminals of service equipment and a point outside the building, clear of building walls, where it is joined to the outside source of electrical supply.

Overload Device: A mechanism designed to automatically open or disconnect the circuit from the source of supply when more current than that for which the circuit or current-consuming equipment is designed, is called for.

Dust-tight: An enclosure so designed that dust will not enter.

Dust-proof: So designed that an accumulation of dust will not interfere with its successful operation.

Vapor-tight: An enclosure designed to resist the entrance of vapor.

Explosion-proof: An enclosure which is capable of withstanding an explosion of a specified gas or vapor which may occur within it. and of preventing the ignition of the specified gas or vapor surrounding the enclosure by sparks, flashes or explosions of the gas or vapor within.

Hoist-Way: A shaftway, hatchway, well-hole or other vertical opening or space in which an elevator or dumb-waiter operates.

Feeder: Any conductors of a wiring system between the service equipment, or the generator switchboard of an isloated plant, and the branch circuit overcurrent device.

Guarded: Covered, enclosed, fenced off, or otherwise protected to remove the liability of contact or approach by persons or objects to a point of danger.

2. **Service Ground:** The neutral wire of a service which is attached by an approved method to the earth via water pipe, driven rod or buried plate.

Equipment Ground: A conductor effectively connecting the frame, structure or enclosure forming a part of the electrical equipment, to the ground.

Grounded Line: A current carrying, normally ungrounded, conductor whose insulation has failed and has come in contact permanently or intermittently with the ground.

3. A bare neutral conductor is permitted only in a Service Entrance run.

4. (a) The high leg. (b) The neutral, if one is used.

5. (a) Each end of the conduit shall be bonded around the box or flex steel with not smaller than #8 wire and shall have approved bonded fittings. (b) Service entrance conductors shall not be spliced except in approved terminating enclosures housing metering equipment, or its equivalent.

6. (a) Where conduit terminates in an enclosure having other than threaded hubs and where lock nuts are required, a lock nut is required on both sides of the enclosure, making double lock nuts. (b) Approved insulated bushings shall be used.

7. Theoretically, none. The neutral is supposed to carry only the unbalanced current of the hot legs.

8 See diagrams.

9. (a) Ordinarily, no physical manifestation. The grounded conductor has no potential against the ground and the two remaining conductors have their full potential against the ground. Ordinarily, no untoward condition of the system occurs and such a condition is usually detected by ground lamps or static ground indicators. (b) In a Wye system the fuse, breaker or other overcurrent protective device goes into immediate operation, opening the lines.

10. (a) Commonly used in ballasts in fluorescent lighting, motor starting and in other places where a two-winding transformer is not required. (b) Commonly used in oil heaters to ignite oil or vapor (c) commonly used in street lighting (series circuits). (d) a method of forcing equal division of load between transformers having considerable difference in impedance characteristics. (e) Special transformers using the Scott or similar connections. (f) Yes. Three-phase to 2-phase or the reverse.

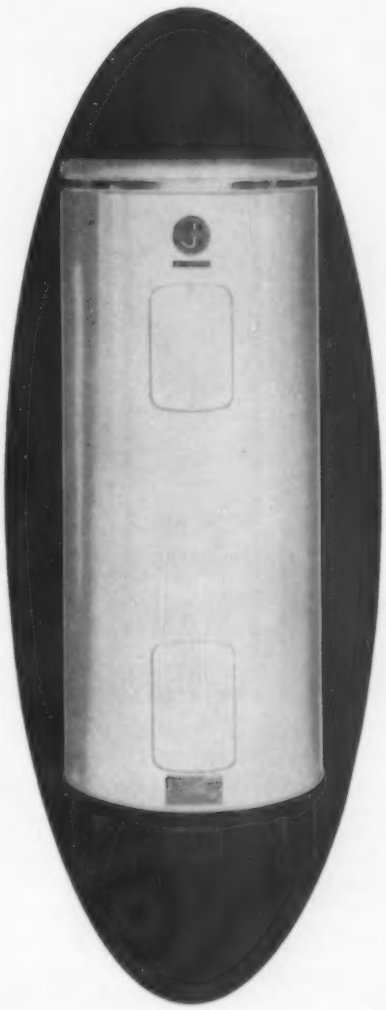
11. Class I. Div. 1 and 2; Class II. Div. 1 and 2; and Class III. Div. 1 and 2.

Class I covers locations in which flammable gases or vapors are, or may be, present in the atmosphere.

Class II covers locatiins which are hazardous because of the presence of combustible dust which is, or may be, held in atmospheric susmospherically held in suspension.

Class II covers locations which ject to easily ignitible fibres or

Checked! Before, During and After!



That's the secret of Jackson's top quality Water Heaters!

- Checked BEFORE the tank is ever galvanized — no tank goes through that can't pass Jackson's rigid air pressure test!
- Checked DURING galvanization — no space is overlooked where rust could creep in!
- Checked AFTERWARD — no heater leaves the factory without the American Underwriters and A.G.A. air and water test.

That's the secret with a Jackson product. The "bugs" are caught at our factory—not after installation.

AND, WHAT'S MORE:

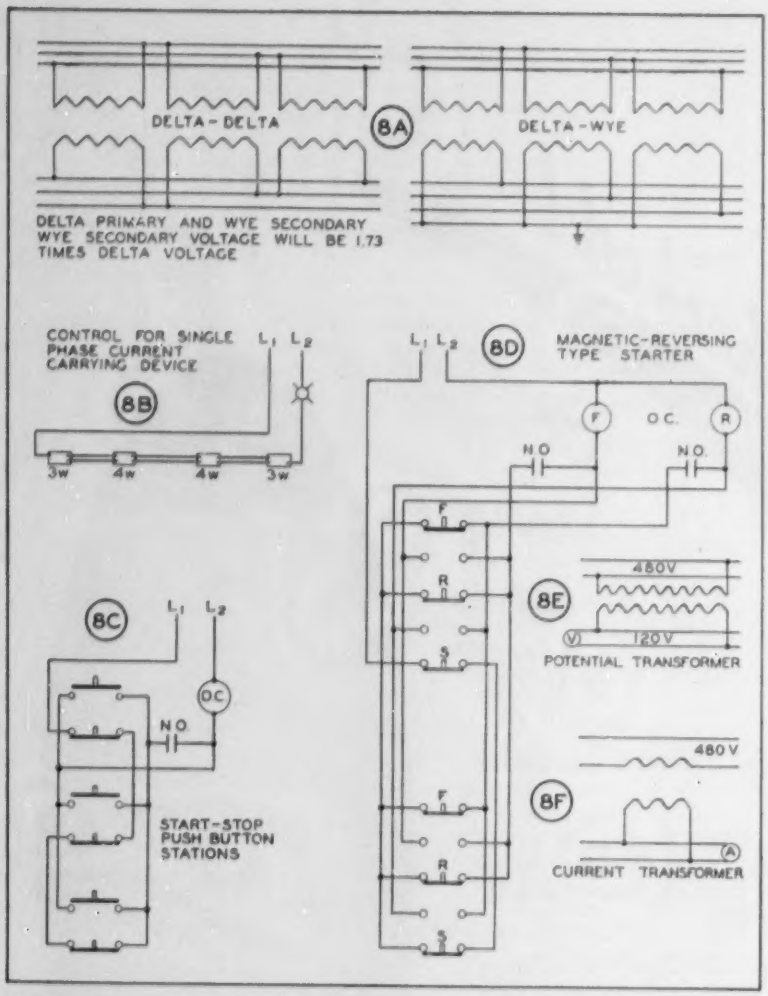
Every Jackson Gas or Electric Water Heater — Galvanized or Glass-Lined, carries the JACKSON WARRANTY.

Wire, write or phone today for information on the COMPLETE Jackson line of Gas and Electric Water Heaters.

JACKSON ®

W. L. JACKSON MANUFACTURING COMPANY

1222 EAST 40TH STREET CHATTANOOGA 7, TENN.



These diagrams represent suitable answers to question No. 8, relating to method of connecting various pieces of electrical equipment.

flyings or other substances of similar nature but not likely to be atmosperically held in suspension.

12. (a) A 3-phase motor having one leg or "hot line" open, forcing the motor to attempt to run on one phase. (b) A term often applied to a synchronous motor attempting to pull into step with the incoming current, and attempting to synchronize. (c) Irregularity of the incoming voltage is often the cause; also, excessive excitation will retard starting speed. If swinging or pulsating is excessive, a common remedy is to apply bridges of copper or brass to the poles. The induced current in these bridges tends to stablize the speed.

13. A megohmmeter, commonly called a "Megger."

14. Changing the number of poles. Varying resistance in the wound armature circuit. Shifting brush positions on armature.

15. (a) An ammeter indicates or shows the actual current in amperes flowing in a given circuit, and is connected only in series in the circuit. The wattmeter indicates or shows the power in watts in a given circuit and has two connections: a voltage coil connected in parallel or across the circuit, and a current coil in series with the circuit. (b) The ratio of the true power or watts to the apparent power or volt-amperes, expressed as a percenage, in an alternating current circuit. (c) Over-excited synchronous motors, and static condensers or capacitors.

16. (a) Bearings and lubrication; current consumption and voltage; mechanical security and operating conditions. (b) An instrument for alternating current measurement having a "clamp around" device, which registers by induction without having an electrical or mechanical connection to the circuit, i.e. an "Amprobe" or "Clamp-on" Ammeter. (c) A fuse and voltage tester.

17. Quote: "Each circuit supplying equipment in or on a dispensing pump (used for flammable liquids) shall be provided with a switch or other acceptable means to disconnect ALL conductors of the circuit from the source of supply." N.E.C. 5120 (e), (Gas Stations).

18. (a) A circuit whose components have more than one phase of line wires. (b) Using an ammeter, divide the load as equally as possible between the various phases. (c) Opening the neutral line causes the 200 watt lamp and the 25 watt lamp to burn in series on a 230 volt circuit. As the resistance of the 25 watt lamp is roughly eight times that of the 200 watt, the smaller lamp will receive eight times the current it would normally consume, causing a rapid burn-out.

19. Three characteristics distinguish the synchronous motor from the standard induction motor: 1) It operates at a constant speed; 2) Its power factor is under the control of the operator; and 3) Separate excitation is required. It is supplied with an auxiliary winding ti give it sufficent torque for starting and is started as an ordinary motor. As it comes up to speed d-c excitation voltage is applied to its field winding, developing a pulling torque tending to pull the motor into step with the frequency of the circuit. Once in step, it tends to maintain a very constant speed, regardless of load until the over-load limit is reached. It does not slow down as will other types of motors. (b) The outside source of direct current is usually a motor-generator set, or may be a direct connected d-c generator.

20. When driven by a prime mover, it may be used as a frequency charger or frequency converter.

21. Tag the disconnect open; then check the line for any abnormal visible condition and also to be sure no one else is on or working on the line. When certain the line is in the clear, proceed, as the situation indicates, to determine the cause of the trouble.

22. Tag the disconnect open or, preferably, lock it open.

23. Check the condition of the ladder, including safety feet. Check

(Continued on page 99)

Announcing...Garden Lighting by Moe Light

year 'round Plus Business...Plus Profits!

NOW...NATIONALLY ADVERTISED

Inspiration-Lighting for patios, gardens, floral settings

Beautifully designed deluxe lights at popular prices, to make evening outdoor living fun for the entire family. All America is moving out-of-doors for dining, entertaining, relaxed enjoyment. You can now offer one of the finest lines obtainable, backed by the merchandising magic of the Moe Light name–Sturdy rustproof aluminum construction, fully weatherproofed, every light complete with SJO cord and duplex receptable plug set.

Here's how Moe Light's attractive, permanent self-seller displays put you right into this profitable business...

M-4950 GARDEN LIGHTING DISPLAY DEAL
(24" x 48" x 54" high)

YOU GET 19 assorted garden fixtures and display stand, plus 2 FREE fixtures and 1 FREE tripod base.

YOUR COST FOR ALL 19 FIXTURES	$ 108.95*
COST OF SELF-SELLER DISPLAY STAND	30.95*
TOTAL COST OF DEAL	**$139.90***
RETAIL VALUE OF 19 ASSORTED FIXTURES	$ 163.05*
RETAIL VALUE OF FREE FIXTURES AND TRIPOD	31.40*

(Free items offset cost of display stand!!!)

*Prices slightly higher Denver and West

BETTER HOMES & GARDENS and SUNSET–JUNE ISSUES...will carry a full-page, full-color ad on Moe Light GARDEN LIGHTING!

Sunset Better Homes

M-4955 FLOWER BOX DISPLAY (2' x 2' x 6")

YOU GET 6 attractive M-4904 "Mushroom" flower box lights, Display Stand, *plus* FREE M-4910, 25' SJO Extension Cord.

YOUR COST FOR ALL 6 FIXTURES	$ 25.00*
COST OF SELF-SELLER DISPLAY STAND	5.95*
25' SJO EXTENSION CORD	FREE
TOTAL DEALER COST	**$30.95***
RETAIL VALUE OF 6 FIXTURES	$ 41.70*
RETAIL VALUE OF FREE EXTENSION CORD	5.95*

(Free extension cord offsets cost of display stand!!!)

MAIL THIS COUPON TODAY...

THOMAS INDUSTRIES INC.,
MOE LIGHT DIVISION, Dept. ES-4
410 S. Third Street, Louisville 2, Ky.

☐ Please send complete information on Moe Light displays in time for that Spring business rush.

☐ Have a representative call on me.

NAME_____

COMPANY NAME_____

ADDRESS_____

CITY_____ ZONE__ STATE_____

THOMAS INDUSTRIES INC.

Originators of MOE Light Inspiration-Lighting

Executive Offices—410 S. Third St., Louisville 2, Ky.

In Canada: 1401 The Queensway, Toronto 14, Ontario, Canada

(MAXIMUM SIDE TAP SAME AS MAIN)

TAPS CABLE SIDE CONNECTION "MECHANICAL"

MAIN CONDR.	HRS. EA.	LABOR COST INSTALLED EACH AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
8	.4	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40	1.50
6	.45	.56	.68	.79	.90	1.01	1.13	1.24	1.35	1.46	1.58	1.69
4	.55	.69	.83	.96	1.10	1.238	1.38	1.51	1.65	1.79	1.93	2.06
2	.6	.75	.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25
1/0	.7	.88	1.05	1.23	1.40	1.58	1.75	1.93	2.10	2.28	2.45	2.63
2/0	.75	.94	1.13	1.31	1.50	1.69	1.88	2.06	2.25	2.44	2.63	2.81
3/0	.8	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00
4/0	.9	1.13	1.35	1.58	1.80	2.03	2.25	2.48	2.70	2.93	3.15	3.38
250 CM	1.0	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75
300 CM	1.05	1.31	1.58	1.84	2.10	2.36	2.63	2.89	3.15	3.41	3.68	3.94
350 CM	1.15	1.44	1.73	2.01	2.30	2.59	2.88	3.16	3.45	3.74	4.03	4.31
400 CM	1.2	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50
500 CM	1.3	1.63	1.95	2.28	2.60	2.93	3.25	3.58	3.90	4.23	4.55	4.88
750 CM	1.4	1.75	2.10	2.45	2.80	3.15	3.50	3.85	4.20	4.55	4.90	5.25
1000 CM	1.45	1.81	2.18	2.54	2.90	3.26	3.63	3.99	4.35	4.71	5.08	5.44
1250 CM	1.55	1.94	2.33	2.71	3.10	3.49	3.88	4.26	4.65	5.04	5.43	5.81
1500 CM	1.65	2.06	2.48	2.89	3.30	3.71	4.13	4.54	4.95	5.36	5.78	6.19
1750 CM	1.7	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10	5.53	5.95	6.38
2000 CM	1.8	2.25	2.70	3.15	3.60	4.05	4.50	4.95	5.40	5.85	6.30	6.75

LABOR: INCLUDES STRIPPING, INSTALLING CONNECTOR AND TAPING JOINT.

4-56

WIRE "ALUMINUM" INSTALLED IN CONDUIT

WIRE SIZE	HRS. "M"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
12	4.8	.006	.0072	.0084	.0096	.0108	.012	.0132	.0144	.0156	.0168	.018
10	7.5	.0094	.0113	.0131	.015	.0169	.0188	.0206	.0225	.0244	.0263	.0281
8	8.4	.0105	.0126	.0147	.0168	.0189	.021	.0231	.0252	.0273	.0294	.0315
6	11.3	.0141	.017	.0198	.0226	.0254	.0283	.0311	.0339	.0367	.0396	.0424
4	14.2	.0178	.0213	.0249	.0284	.032	.0355	.0391	.0426	.0462	.0497	.0533
2	19.5	.0244	.0293	.0341	.039	.0439	.0488	.0536	.0585	.0634	.0683	.0731
1	21.4	.0268	.0321	.0375	.0428	.0482	.0535	.0589	.0642	.0696	.0749	.0803
1/0	24.6	.0308	.0369	.0431	.0492	.0554	.0615	.0677	.0738	.08	.0861	.0923
2/0	27.6	.0345	.0414	.0483	.0552	.0621	.069	.0759	.0828	.0897	.0966	.1035
3/0	30.2	.0378	.0453	.0529	.0604	.068	.0755	.0831	.0906	.0982	.1057	.1133
4/0	34.9	.0436	.0524	.0611	.0698	.0785	.0873	.0959	.1047	.1134	.1222	.1309
250 MCM	37.6	.047	.0564	.0658	.0752	.0846	.094	.1034	.1128	.1222	.1316	.141
300 MCM	41.8	.0523	.0627	.0732	.0836	.0941	.1045	.115	.1254	.1359	.1463	.1568
350 MCM	45.4	.0568	.0681	.0795	.0908	.1022	.1135	.1249	.1362	.1476	.1589	.1703
400 MCM	47.3	.0591	.071	.0828	.0946	.1064	.1183	.13	.1419	.1537	.1656	.1774
500 MCM	51.9	.0649	.0779	.0908	.1038	.1168	.1298	.1427	.1557	.1687	.1817	.1946
750 MCM	62.5	.0781	.0938	.1094	.125	.1406	.1563	.1719	.1875	.2031	.2188	.2344
1000 MCM	69.5	.0869	.1043	.1216	.139	.1564	.1738	.1911	.2085	.2259	.2433	.2606

LABOR: FOR PULLING ONLY. AVERAGE RUNS OF 14 FT. FOR SMALL SIZES, AND 100 FT. PULLS FOR FEEDER SIZES. (3 WIRE PULLS).

4-56

Estimating tabulations published by special permission from "Blue Book of Electrical Estimating," Estimating Handbooks Associates, DeKalb, Illinois. Copyright 1953 by Geo. L. Sherlock.

A New Name

in the CONDUIT FITTINGS INDUSTRY!

These Outstanding Features Make Your Work Easier!

1. UL APPROVED!
2. MADE OF CAST MALLEABLE IRON, STRONG—RUGGED—DURABLE!
3. MORE WORK AREA INSIDE FITTINGS—SCREWS IN CORNERS —NO OBSTRUCTIONS!
4. GROUND SURFACES GIVE TIGHTER COVER AND GASKET SEAL!
5. HOOKS AND LOOPS ADDED TO RECTANGULAR TYPES FOR YOUR NEEDS—MADE TO ORDER FAST!

Gives You Everything You Need to Provide Fast Starts and Completions on Your Jobs!

Ideal-Simplet Conduit Fittings are a broad, flexible line of *quality* products. They are designed to help you meet the requirements of specific installations. You can lay out systems according to *your* best interests — no necessity for specifying allied products not completely suited to your needs. You *get* the fittings *you* want...no "extras" required!

What's more, Ideal-Simplet fittings are delivered to you *fast*... when *you* want them. And, field service help is available when needed. The style categories listed indicate only some of the more popular fittings. Look them over — *and ask for them by name on your next job*...IDEAL-SIMPLET CONDUIT FITTINGS!

Write for Complete Catalog Information and Where to Get Them!

IDEAL SIMPLET *Quality* PRODUCTS

• RECTANGULAR SIMPLETS

with covers and receptacles in standard hub styles and sizes. Tapered thread and no-thread. Popular L, LB, C, T, LL, LR, LRL and many others, including double-face and flange units.

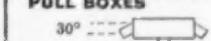
• FS AND FD SIMPLETS

Threaded and no-thread series. Single and gang units with device interchangeability feature. Covers include cast vapor tight types with cork or neoprene gaskets.

• ROUND SIMPLETS

Includes G, H, SE, SEH, P, PM, OS and OSL, etc. series, in variety of hub styles and sizes. Cast or steel covers with cork or neoprene gaskets. OSL types ideal for embedding in concrete!

• SIMPLET WEATHER-PROOF JUNCTION AND PULL BOXES



Used in subways, underpasses, etc. Type A with 4 hubs, type B with 4 hubs at convenient 30° down angle. Extension ring gives greater depth, fits smaller diameter devices.

• VAPORTIGHT SIMPLETS LIGHTING FIXTURES

For universal application. Assorted sizes and styles including popular VW for masonry walls, VU for exposed systems, VO for mounting to sheet metal boxes. Same base with adapter makes changeover from 100-watt to 150 or 200-watt units. Long-lasting aluminum parts. Accessories and reflectors available.

• HANGING DEVICES

Include the ALC for use with incandescent systems. Accessories, trigger hook lock assemblies, pendant loops, etc., available.

• VAP-OIL-TITE CONNECTORS

For use with liquid-tight flexible conduit. Provides positive seal, prevents costly shorts and down-time!

• "FRICTION-SET" FIXTURE HANGERS

...align lighting systems with a twist of the wrist. Complete assembly.

• NEW! LOW-COST FIXTURE HANGER

With 38° total adjustment. Fast, low cost mounting. With chains, hooks and cord clips.

IDEAL-SIMPLET FITTINGS, INC. • A SUBSIDIARY OF IDEAL INDUSTRIES, INC. IDEAL

1017 Park Ave., Sycamore, Illinois

BASED ON 100 FT. SPANS OR LESS

ALUMINUM OVERHEAD CONDUCTORS 16' HT.

WIRE SIZE	HRS. "M"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
8	3.2	.004	.0048	.0056	.0064	.0072	.008	.0088	.0096	.0104	.0112	.012
6	4.0	.005	.006	.007	.008	.009	.01	.011	.012	.013	.014	.015
4	5.0	.0063	.0075	.0088	.01	.0113	.0125	.0138	.015	.0163	.0175	.0188
2	6.8	.0085	.0102	.0119	.0136	.0153	.017	.0187	.0204	.0221	.0238	.0255
1	7.5	.0094	.0113	.0131	.015	.0169	.0188	.0206	.0225	.0244	.0263	.0281
1/0	8.6	.0108	.0129	.0151	.0172	.0194	.0215	.0237	.0258	.028	.0301	.0323
2/0	9.7	.0121	.0146	.017	.0194	.0218	.0243	.0267	.0291	.0315	.034	.0364
3/0	10.5	.0131	.0158	.0184	.021	.0236	.0263	.0289	.0315	.0341	.0368	.0394
4/0	12.2	.0153	.0183	.0214	.0244	.0275	.0305	.0336	.0366	.0397	.0427	.0458

LABOR: FOR INSTALLING AND TYING TO INSULATORS.

4-56

BASED ON 100 FT. SPANS OR LESS

COPPER WEATHERPROOF ON INSULATORS 16" HT. ATTACHED TO BLDG'S.

WIRE SIZE	HRS. "M"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
10	3.0	.0038	.0045	.0053	.006	.0068	.0075	.0083	.009	.0098	.0105	.0113
8	3.4	.0043	.0051	.006	.0068	.0077	.0085	.0094	.0102	.0111	.0119	.0128
6	4.3	.0054	.0065	.0075	.0086	.0097	.0108	.0118	.0129	.014	.0151	.0161
4	5.4	.0068	.0081	.0095	.0108	.0122	.0135	.0149	.0162	.0176	.0189	.0203
2	7.6	.0095	.0114	.0133	.0152	.0171	.019	.0209	.0228	.0247	.0266	.0285
1	8.4	.0105	.0126	.0147	.0168	.0189	.021	.0231	.0252	.0273	.0294	.0315
1/0	9.8	.0123	.0147	.0172	.0196	.0221	.0245	.027	.0294	.0319	.0343	.0368
2/0	11.1	.0139	.0167	.0194	.0222	.025	.0278	.0305	.0333	.0361	.0389	.0416
3/0	12.4	.0155	.0186	.0217	.0248	.0279	.031	.0341	.0372	.0403	.0434	.0465
4/0	14.5	.0181	.0218	.0254	.029	.0326	.0363	.0399	.0435	.0471	.0508	.0544

LABOR: FOR INSTALLATION AND TYING TO INSULATORS AND TAPS.

4-56

Estimating tabulations published by special permission from "Blue Book of Electrical Estimating," Estimating Handbooks Associates, DeKalb, Illinois. Copyright 1953 by Geo. L. Sherlock.

Announcing . . .

a new hinged design*

in ceiling

pan fixtures by

PERFECLITE

Perfeclite now offers a new **hammer lock** design in incandescent ceiling pan lighting fixtures. No other ceiling pan fixture on the market today has all these engineering features:

- Globe opens on **hinge** for quick easy cleaning and relamping.
- Unique **safety locking fitter** holds globe in place without bothersome screws, unsightly extensions or trick springs. Globe is secured with lugs by simple twist of the wrist.
- Lip of globe is completely protected against breakage by a **steel protector ring.**
- Provides **ceiling illumination** as well as **evenly distributed floor lighting.**
- Minimum amount of metal, maximum amount of glass results in **highest light efficiency.**

Here is a unique ceiling pan fixture design for either commercial or residential installation. For further information fill in and mail the attached coupon today.

Perfeclite's new **hammer lock** fixture is available in the following sizes:

Model	Glass Diameter	Wattage
HH-9	8"	2- 40 W
HH-11	10"	1-100 W
HH-13	12"	2- 75 W
HH-15	14"	2-100 W
HH-17	16"	3-100 W

SUSTAINING MEMBER

Fixtures are Underwriters Laboratories, Inc. approved.

*Patent pending

THE PERFECLITE COMPANY

1457 East 40th Street • Cleveland 3, Ohio

Gentlemen:

Please send me The Perfeclite Data Sheet 56-A

Name.....

Address.....

City.....State.....

PERFECLITE PRODUCTS

THE MARK OF LIGHTING SERVICE

One Meter for Two Types of Services

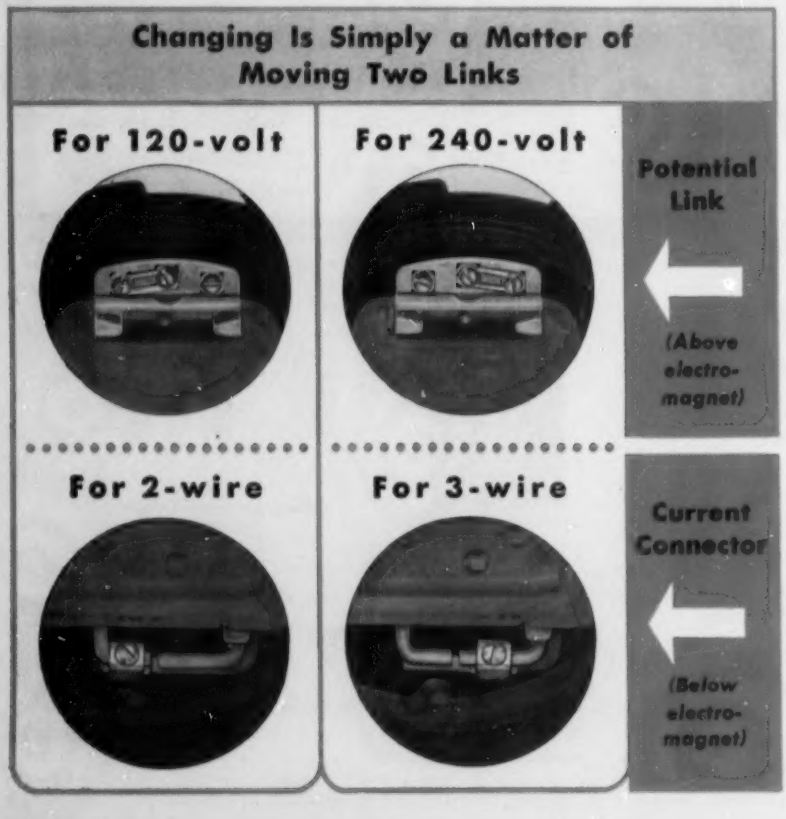
DUNCAN TYPE MK

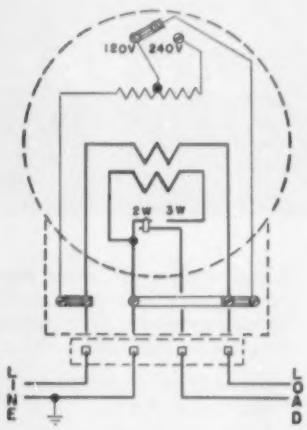
2- or 3-wire singlephase

● The Duncan Type MK 15 amp *2-3 wire* meter may be used to meter either a 120-volt *2-wire* or a 240-volt *3-wire* service. This type of meter is particularly applicable where new *2-wire* meters are needed now but would be obsoleted soon as services are changed to *3-wire*.

The MK 15-ampere *2-3 wire* is of the "extended range" type and has full 100 ampere capacity when used on either a *2-* or *3-wire* service. The added capacity of the MK meter keeps it ahead of the expanding use of electric energy.

The meter is quickly converted from one type of service to the other by moving two links—*see illustrations below*. When converted, the calibration may be checked if desired, however the inter-range accuracy is within accepted commercial limits. Close accuracy on either type of service is made possible by a tapped potential coil—the mid-tap designed for 120-volt operation, the full coil for 240-volt operation. To keep the K_h constant the same for either service one current coil is used for *2-wire* operation and both coils are used for *3-wire* operation (see connection diagram).





This diagram illustrates typical 2-3 wire connections for MK-A meter. The MK-S is similar. See new Bulletin 185.

This is a Duncan contribution to better, more economical metering.

DUNCAN ELECTRIC MFG. CO.
Lafayette Indiana

(Advertisement)

Utility Engineers' Forum

Design
Installation
Testing
Maintenance

Substation grounding practices

by E. P. Miller
Electrical Engineer, South Carolina Electric and Gas Co., Columbia, S. C.

◆ THE STARTING POINT in a practical discussion of substation grounding is "How low a resistance should we strive for in our substation grounds, and what can be done in high resistance areas to improve our station grounds and obtain lower resistances?" For convenience, we may divide substations into two classes, large and small, or transmission and distribution.

Transmission substations are usually large in size and contain relatively large transformer banks, one side of which is connected in wye with neutral grounded. Ground currents flowing from these banks are usually quite heavy. If these large currents are compelled to flow through a high resistance ground, large voltage drops will occur. These high voltages may cause damage to personnel, service, and equipment.

One ohm recommended

To limit the voltage gradients within the earth, to avoid so far as possible damage to the large and expensive equipment installed in these substations, and to reduce interruptions to service, a low resistance ground is required; but every cloud must have a silver lining and the very size of the equipment to be protected usually makes it possible to obtain a ground of reasonably low resistance, while the high cost of repairing or replacing the equipment makes practical the expenditure of relatively large sums to adequately protect it. For all of these reasons, we believe that every reasonable effort should be made to obtain a ground resistance at such stations in the order of one ohm.

Frequently a resistance as low as this, or even lower, will be obtained automatically if an adequate grounding network is installed. The minimum grounding network should consist of multiple driven rods or buried electrodes, or both, connected together to form a ring around the equipment to be protected.

In high resistance areas this minimum network may not provide a resistance as low as desired. In these cases the ring is extended to cover a greater area and include more ground rods. This has a double advantage. The greater number of rods which can be installed to maximum advantage in the larger area provides a lower over-all resistance and at the same time the current density in the earth is reduced so there is much less danger of excessive voltage gradients near ground surface.

In a few cases it was found impossible to drive the rods as deep as we would have liked because of the presence of a bed of granite which underlies the entire substation, and even by utilizing the large area available for driving rods it was found impractical to reduce the resistance below two ohms. In one such case, the anticipated ground currents were so high that a grid was installed over the ground network and connected to it, to reduce the possible voltage gradients near the surface of the earth.

Grounding small stations

Distribution and customer substations are usually much smaller in size, contain smaller transformer banks and are not required to handle such large ground currents. In most cases, we have been satisfied with 10 ohms for this type substation although we sometimes find, in setting up the minimum ground mat, that the resistance is well below this value.

This minimum ground mat consists of a belt or ring of 2/0 wire surrounding the equipment and structures, all of which are connected to it, and the belt itself is connected to at least four ground distant around the belt but at a rods spaced more or less equi-

These comments were presented as an introduction to a discussion period on the subject of substation grounding practices at a recent meeting of the Engineering and Operations Section, Southeastern Electric Exchange.

Tight and Neat...
WITH JUST A FEW SQUEEZES!
Kearney
SERV-ENS
Service Entrance Sleeves
Designed and engineered for fast, high-conductivity connections, KEARNEY sleeves help your crews do better work in less time. These compressed joints cannot come loose or corrode. Each sleeve contains KEARNALENE, a high-conductivity paste inhibitor. Ends are capped with color-coded plastic to show the complete range of sizes and combinations.
JAMES R. KEARNEY CORPORATION • 4224-42 CLAYTON AVE., ST. LOUIS 10, MO.
Canadian Plant: GUELPH, ONTARIO
for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify
JAMES R. KEARNEY
The Mark of Quality
KEARNEY
PRODUCTS

minimum distance from each other of fifteen feet.

If the substation is more extensive, the belt is cross connected at two or more points and additional ground rods driven within the area covered. If the desired value of resistance is not obtained by these means, the belt is extended to cover more area and permit driving more ground rods, maintaining at least fifteen feet between rods.

Fence grounding

An important consideration in substation grounding practices is whether or not to ground the substation fence, and if it is grounded, whether or not the fence ground should be connected to the equipment ground.

Our practice is to always ground the fence. A belt of 2/0 wire is buried not more than two feet from the fence and connected to the fence and to a ground rod at least once on each run of the fence with the further provision that the distance between connections and between rods shall not be greater than 100 feet.

The fence is also connected to the ground belt on each side of any gate, and the gate itself connected to the ground wire by flexible braid or rope. At each point where the fence is grounded, individual strands of the 2/0 riser are served around the main conductor and tapped to each barbed wire and to four points on the fence, using #6 split-bolt connectors.

If the eqiupment ground is less than fifteen feet from the fence ground it has been our custom to tie them together although in exceptional cases this may be omitted, but if the two are everywhere separated by more than fifteen feet, we do not connect them.

Another factor to be given consideration is whether to connect the lighting arrester grounds to the equipment grounds. The National Electrical Code requires certain minimum conditions of the equipment ground before permitting the lightning arrester to be connected to it.

These minimum requirements include multiple grounds or connection to a continuous metallic water pipe. They are intended to protect personnel against high voltages that might be impressed on a transformer tank or secondary as a result of failure of a primary arrester if the arrester ground were con-

(Continued on page 98)

Here's the PITCH
for faster, more economical anchoring
CHANCE BLACKFOOT ANCHORS
Can be installed by machine to cut line construction costs
Here's a screw anchor that goes down fast and easy whether your line crews install it by hand or by machine. A king-size thimbleye on the Chance Blackfoot will accommodate a big turning bar for easy hand installation. And when you machine-install a Chance Blackfoot Anchor, you reduce installation time to a minimum—which means a big savings in time and money!
What about holding power? Dynamometer tests on a Chance 15 inch Blackfoot Screw Anchor showed no creep at 22,000 pounds!
SMALLER HUB
Smaller hubs on Chance Screw Anchors mean less friction—easier installation. Less earth is disturbed during installation. That's why the Blackfoot has greater holding power.
PITCH CONTROLLED
This accurately pitched, fast cutting blade really goes down fast. Every size anchor is individually "pitch controlled."
Man! that anchor comes down fast!
"ANCHORING" is the most complete guide to anchoring and guying ever developed. It shows how to choose the right anchor for every job—and how to install it right. Send for your copy!
A·B·CHANCE CO·
CENTRALIA, MISSOURI
San Francisco, California · Pittsburgh, Pennsylvania

Pengo Tension Wire stringer being used by the Bechtel Corporation stringing 1,033,500 CM ACSR Curlew, Calol-filled Cable for the Southern California Edison Co., Los Angeles, California.

The latest method of stringing conductors

- ***Safest, most economical for transmission, distribution and even secondary lines.***
- ***Its greatest savings are effected when stringing over and through energized circuits... by far the safest, too!***

Operation of the PENGO Tension Wire Stringer is almost unbelievably smooth. Because the tensioning is done on the Neoprene-Lined Bullwheels rather than on reels, conductor damage from the reels has been eliminated entirely. Due to the Neoprene lining of the Bullwheels, it is possible to use a full range of wire sizes to maximum groove capacity, which, in the case of the Model 6000-WS shown in picture, is Pheasant or 1⅜" diameter.

SMOOTH, POSITIVE CONTROL OF CONDUCTOR TENSION can be maintained at all times regardless of model or size of PENGO Tension Wire Stringer used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

In addition to the model shown in the picture, all series are available in low-slung trailer mounts for mountain work with separate easy-loading reel trailers.

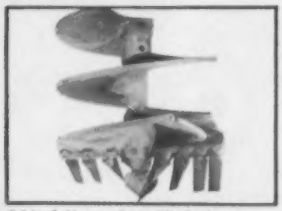
List your requirements and send for descriptive literature and prices.

PETERSEN ENGINEERING CO.
Santa Clara, California - Dept. 19
Please send me more information on the new Pengo Tension Wire Stringer.
Name_____
Firm_____
Address_____
City_____ State_____

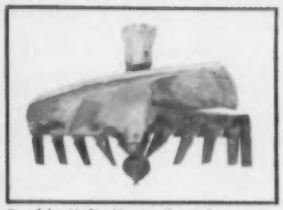
Made by the makers of the World-Famous
PENGO EARTH AUGERS

PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

Other PENGO Products include:



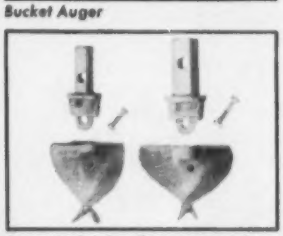
24 inch Heavy Duty Flight Auger



Double-Helix Heavy Duty Auger

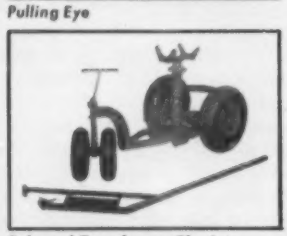
Offset Boring Head

Bucket Auger



Screw Bit for Small Diameter Holes

Pulling Eye



Pole and Transformer Chariot

Controlled tension wire stringing

◆ STRINGING overhead lines under controlled tension is a gigantic step forward in savings of cost and time, plus providing additional safety for crews and the public.

That is the opinion of distribution and transmission officials for El Paso Electric Company, a progressive public utility which is always on the lookout for equipment which provides additional safety.

El Paso Electric recently acquired two 5000-R series Pengo tension wire stringers. Currently being used for stringing over energized circuits, the two tension wire stringers make heavy work easy and has simplified the entire procedure for all types of stringing. They are made by the Petersen Engineering Company, of Santa Clara, Califorina.

The two Pengo units are now in use on a reconductoring job near Mountain View sub-division, one of the largest home development areas in Texas.

Pulling over hot lines

"We are replacing three number two copper wires with 336,400 ACSR and pulling it in over a hot 4-kv line. It's perfectly safe with the Pengo equipment and is a far cry from the old days," an official pointed out.

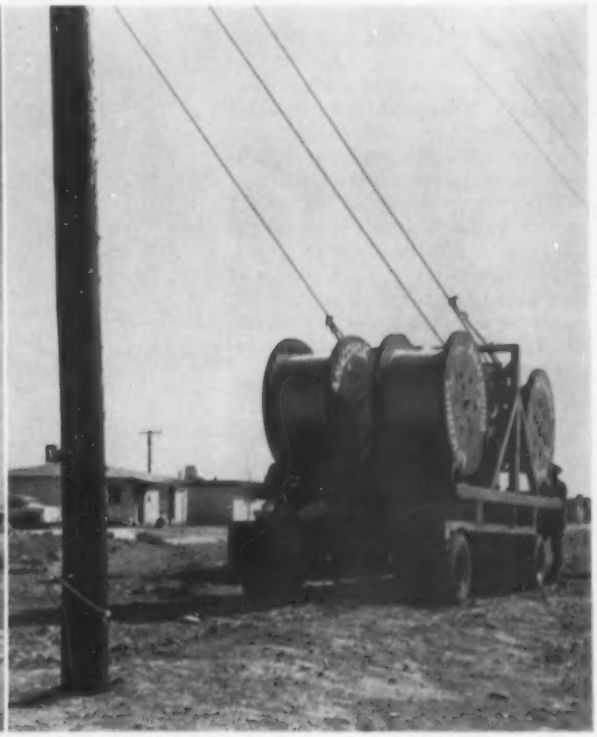
The same job before the Pengo equipment would have required placing the reels up on jacks and using one man to handle each reel. Now one man can be assigned to safely watch all four reels being pulled simultaneously, with utmost safety and complete control.

Many other hazards have been eliminated entirely and, even though there is little possibility of contact with hot lines, the Pengo machines are grounded as an added safety precaution.

The units owned by El Paso Electric are two 5000-R Series Pengo tension wire stringers. This particular machine will string four conductors under tension up to a size of 366,000-CM ACSR or all-aluminum. There are four sets of grooved drums or "bull" wheels 26 inches in diameter, around each of which there are four wraps of wire to prevent slippage. Grooves are neoprene-lined to prevent damage to the conductor and further to insure against any possible slippage. Vertical rubber rollers guide the wire on and off the bull wheels.

On the shaft of each of the bull wheels there is a smooth acting brake of the type used for emer-

(Continued on page 98)



In the picture at left, an attendant regulates tension by means of handwheel cranks. Four pairs of grooved bull wheels hold wire tension so uniform that conductors may be tied in without sagging. The picture at right shows how reels at each end of the machine ride on flanged rubber-tired wheels.

Conductor weight comparison

Single-phase vs three-phase

by F. C. DeWeese

◆ THE RELATIVE conductor requirements for transmitting a given load over a three-phase circuit to that required for transmitting an equal load over a single-phase circuit is not readily apparent. For equal load and equal percentage power loss there exists, however, a definite relation between the weight of conductor required for a single-phase, 2-wire circuit, and a three-phase, 3-wire circuit, having equal voltages between phase wires.

Except for comparatively low voltage, the transmission of electric power is confined almost entirely to three-phase circuits. Single-phase circuits are used quite extensively, however, for supplying loads, not actually requiring three-phase supply, at voltages up to about 13.2 kv.

Quite frequently distribution and design engineers are confronted with the problem of determining the most economical and practicable method of supplying service to loads which are applicable for either three-phase or single-phase supply. It is the purpose of this paper to provide a simple and easily applied method for determining the relative conductor requirements in such cases.

Line-to-neutral method

Very probably the most satisfactory method to be employed in comparing single-phase and three-phase circuits is to refer the voltage between phase wires to voltage in terms of phase wire to neutral. Or what is known as the "line-to-neutral method." In this way it is possible to compare lines of equal length, using as a basis, one wire of each circuit.

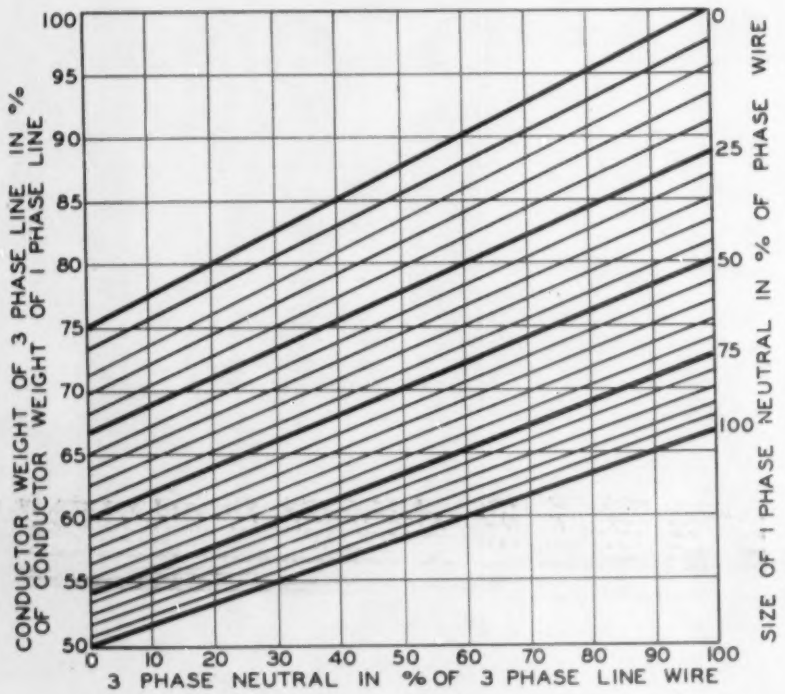
The line to neutral voltage of a single-phase, 2-wire circuit, is equal to E/2. The line to neutral voltage of a three-phase circuit is equal to $E/\sqrt{3}$. Where E is the phase-to-phase voltage, the kw or kva load to neutral, or per phase, as you wish to call it, for single-phase is equal to one-half the total load; for a three-phase circuit, the load to neutral is one-third the total load.

Practical example

Assume, for example, a 2-wire single-phase circuit, and a 3-wire three-phase circuit, having equal lengths, to operate at 6,600 volts between phase wires, each circuit to transmit 500 kw at unity power factor at a power loss of 5%. The problem is to find the weight of conductor required for one circuit in terms of that required for the other.

For equal power and equal percentage power loss, the weight of conductor varies inversely as the square of the voltage, from which the ratio of weight of each conductor in a three-phase 3-wire circuit to the weight of conductor required for a single-phase 2-wire circuit is equal to $2/3 \times (E/2)^2/(E/\sqrt{3})^2 = 1/2$ the weight of each conductor in a single-phase circuit.

Referring to the example above, the voltage to neutral for single-phase = 6,600/2 = 3,300 volts. The load to neutral is equal to 500/2 =



Comparison of weights of 4-wire three-phase lines with two-wire or three-wire single-phase lines for equal phase voltage and equal total power transmitted. See tabulated data in Table I.

250 kw. The single-phase current, $I_1 = 250/3.3 = 75.55$ amp. At 5% power loss the loss per phase $= 0.05 \times 250 = 12.5$ kw. The resistance $R_1 = 12{,}500/(75.55)^2 = 2.18$ ohms.

For the three-phase circuit the voltage to neutral $= 6{,}600/\sqrt{3} = 3{,}810$ volts. The load to neutral $= 500/3 = 166.67$ kw. The current per phase, $I_3 = 166.67/3.81 = 43.75$ amp. I^2R loss $= 0.05 \times 166.67 = 8.33$ kw per phase. The resistance per phase, $R_3 = 8{,}333/(43.75)^2 = 4.36$ ohms. Since the weight of conductor for a given length varies inversely as the resistance, the weight per wire, three-phase, $= 2.18/4.36 = 0.5$, or 50% of the weight of each conductor single-phase. This derives and checks the value as computed by the equation previously given.

Using a base weight of unity per wire, single-phase, the relative total weight $= 2 \times 1 = 2$. By the same method we have for the relative total weight, three-phase, $3 \times 0.5 = 1.5$. The relative weight of conductor required for the three-phase circuit is therefore $1.5/2 = 0.75$ or 75% of the total weight of the two conductors required for the single-phase circuit

Length not involved

It should be particularly noted that a knowledge of the length of either circuit is not required. The only stipulation is that the length of both lines (not conductors) be the same.

In single-phase 2-wire circuits and three-phase 4-wire circuits the neutral bears no fixed relation to the size of the phase wires. For this reason, the relative weights of the conductor cannot be determined from any theoretical consideration. The size of the neutral is usually selected on a basis of any current which may be expected to flow in the neutral from any unbalanced load condition. Table I has been compiled to give the relative weights of conductor for combinations on a basis of the neutral being ¼, ½, ¾ and equal to the weight of one-phase wire. However, the relative weights for combinations other than those given in Table I, as will be shown later, may be very readily determined.

Since conductor sizes, in terms of area and weight, do not ordinarily bear the same relation to each other as those given in Table I, Table II has been compiled to give the actual relative weights for sizes 4/0 and smaller. With the aid of the values in Table I, a determination of actual relations for any given condition resolves itself into a comparatively simple problem.

The table values are based on the same kind of material for the conductors to be used for both single-phase and three-phase. Should the conductor of one circuit differ from that of the other, this will have to be taken into consideration.

It may be well to explain how

Table I

Relative conductor weights for various combinations of single-phase and three-phase circuits

Figure (below)	Number of wires	Relative size N	Ratio 3-phase to 1-phase	Relative cond. wt. %
	(a) 2	0		100 (Base wt)
	(c) 3	0	1.5/2	75
(1)	(c) 4	¼	1.625/2	81.25
	(c) 4	½	1.75/2	87.5
	(c) 4	¾	1.875/2	93.75
	(c) 4	1	2/2	100
	(b) 3	¼		125
	(c) 3	0	1.5/2.25	66.67
(2)	(c) 4	¼	1.625/2.25	72.22
	(c) 4	½	1.75/2.25	77.78
	(c) 4	¾	1.875/2.25	83.33
	(c) 4	1	2/2.25	88.89
	(b) 3	½		150
	(c) 3	0	1.5/2.5	60
(3)	(c) 4	¼	1.625/2.5	65
	(c) 4	½	1.75/2.5	70
	(c) 4	¾	1.875/2.5	75
	(c) 4	1	2/2.5	80
	(b) 3	¾		175
	(c) 3	0	1.5/2.75	54.55
(4)	(c) 4	¼	1.625/2.75	59.09
	(c) 4	½	1.75/2.75	63.64
	(c) 4	¾	1.875/2.75	68.18
	(c) 4	1	2/2.75	72.73
	(b) 3	1		200
	(c) 3	0	1.5/3	50
(5)	(c) 4	¼	1.625/3	54.17
	(c) 4	½	1.75/3	58.33
	(c) 4	¾	1.875/3	62.5
	(c) 4	1	2/3	66.67

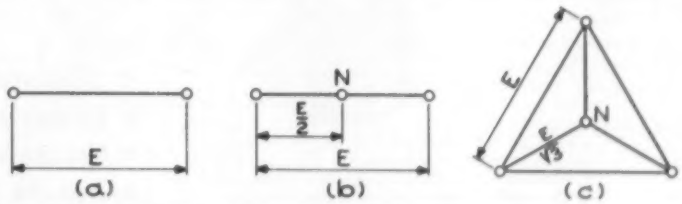


Table II

Weight of neutral in per cent of phase wire

Phase wires	Wt per foot	Neutral conductor 3/0	2/0	1/0	1	2	4	6	8
4/0	0.6533	79.3	62.9	49.8	39.5	30.7	19.3	12.2	7.65
3/0	.5181		79.3	62.9	49.4	38.8	24.4	15.3	9.65
2/0	.4109			79.3	62.3	48.9	30.8	19.3	12.2
1/0	.3257				78.6	61.7	38.8	24.4	15.4
1	0.2559					78.5	49.4	31.1	19.5
2	.2009						62.9	39.5	24.9
4	.1264							62.9	39.6
6	.0795								62.9

4/0 = 7, 12 or 19 strands. 2/0 and 1/0 = 7 strands. Other sizes solid.
3/0 = 7 or 12 strands. #1 = 3 strands.

Look!

No Sealing Ring required!

New, Revolutionary SOCKET METER TROUGH Design by B & C

Completely Eliminates Extra Cost and Installation Bother of the Sealing Ring

Available in steel or aluminum . . . single sockets or gang units for both vertical and horizontal mounting . . . with or without buses and disconnects . . . 5th and 6th terminals available.

Patented

Only 3 Quick Installation Steps

1. Insert meter in jaws!
2. Place cover over meter and under top head!
3. Swing bottom latch over cover tab and seal!

All terminals are 4/0 capacity Hinge-Type, high strength copper. The unique PRESSURE PLATE design is adjustable from #8 wire size to 4/0 cable. The 45° angle of the terminal lugs eliminate sharp bends of the wire. The Hinge feature provides simple, easy conductor entrance and maximum connection security.

Positive corrosion protection... grey hammertone enamel is baked on over special chemical coatings for both steel and aluminum enclosures.

Simplified Construction!

- ★ **Completely Weatherproof!**
- ★ **Easier to Install and Maintain!**
- ★ **Unexcelled Performance!**
- ★ **Ample Knockouts!**

This new B&C design is undoubtedly the finest METER TROUGH ever made . . . it truly deserves your most careful consideration for any type of installation. One of the big features is *plenty of wiring space* . . . the single units are 8" x 8" x 3½" . . . the multiple units are on 8" centers both horizontally and vertically. All conduit hubs are interchangeable on standard openings of 1¼", 1½", and 2" and 2½". Interchangeable 1" openings are available if required. Hubs may be ordered separately.

Write for descriptive catalog containing installation data and price list.

B and C

Your Seal of Dependability and Safety

METAL STAMPING COMPANY

590 MEANS ST., N. W. • ATLANTA, GEORGIA

the values under the columns in Table I headed "Ratio 3-Phase to 1-Phase" and "Relative Conductor Weight %" are derived.

Group (1), Line 1, Fig. (a): Total weight of the two wires assumed as 100%. Line 2, Fig. (c): Since there are three wires, and each wire, as previously determined, is equal to ½ the weight of each wire in Fig. (a), the total weight = $0.5 \times 3 = 1.5$. Since we are comparing Fig. (a), Line 1, with Fig. (c) Line 2, the ratio = $1.5/2 = 0.75$ or 75%.

Line 3, Group (1): "Under Relative Size N," N is given as ¼ the size of either phase wire, Fig. (c), and as each phase wire is ½ the size of phase wire in Fig. (a), we have $1.5 + .5 \times .25 = 1.5 + .125 = 1.625$. Accordingly, $1.625/2 = .8125 = 81.25\%$.

In group (2), line 1, Fig. (b), N is given as ¼. Since the two-phase wires, group 1, line 1, are given as 100%, the value for line 1, group (2) is 125%. Other values may be verified in the same manner.

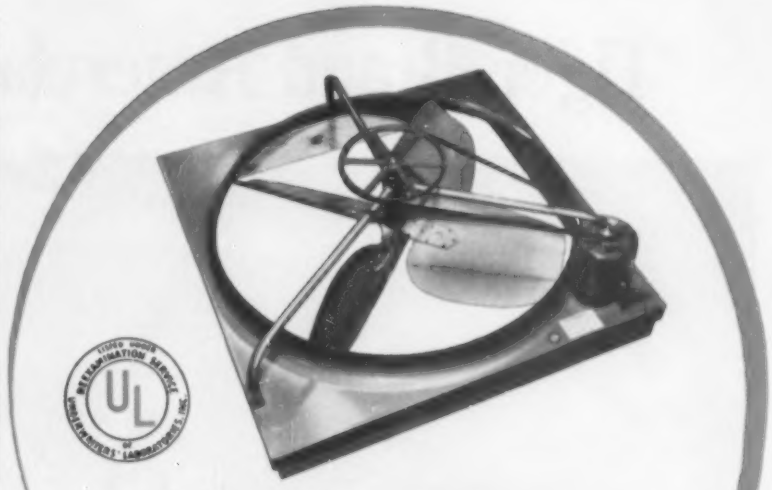
To determine relative weights for combinations other than given in Table I, proceed as follows:

Assume the neutral to have a relative weight of 38.8%. From Table II, this corresponds to a 3/0 phase wire and #2 neutral, or a 1/0 phase wire and #4 neutral. Assume further, that we wish to compare this with a single-phase circuit having a neutral equivalent to ½ the phase wire. Refer to Table I, group (3), line 3. The ratio is seen to be $1.625/2.5 = 0.65$. With the neutral having a weight of 38.8%, we have a total base weight equal to $(1.5 + 0.5 \times 0.388)/2.5 = 67.75\%$.

Assume that instead of the neutral, group (3), Fig. (b), being ½ the size of the phase wire, it is 30.8%. In this case, one-phase wire and the neutral would be $100 + 30.8 = 130.8\%$. It follows, then, that the ratio will be $1.694/2.308 = 73.4\%$. In this last analysis, the relative size N, in either Figs. (b) or (c), differs from any given value in Table I. However, when values such as given in Table I, are available, the derivation of results for other values, has been demonstrated to resolve itself into a comparatively simple program.

In cases where the three-phase voltage to neutral equals the single-phase voltage between phase wires, such as 2.3/4 kv-Y, the ratio will be $(1/\sqrt{3})^2 = ⅓$, instead of ½, as in the previous case. Then,

(Continued on page 99)



YOUR CUSTOMERS WANT AND NEED THE

DEPENDABILITY

OF CONSO

WINDMASTER

ATTIC AND WALL EXHAUST FANS

Stock up now. More and more electrical contractors and builders across the country are turning to Conso Windmaster Fans for dependability and long service at low cost. 24", 30", 36", 42" and 48" sizes available for immediate delivery — full shutter and accessory line — send for free catalog.

8 SHIPPING POINTS MEAN LOWER FREIGHT RATES

Houston, Tex.; Dallas, Tex.; San Antonio, Tex.; New Orleans, La.; Atlanta, Ga.; Tampa, Fla.; Waukesha, Wis.; Bridgeport, Conn.

A few choice territories are available for manufacturers' representatives. Write giving full details.

MAIL THIS COUPON FOR FULL DETAILS

CONSOLIDATED GENERAL PRODUCTS, INC.
P. O. Box 7425, Houston 8, Texas

Please mail additional information on Conso Windmaster Attic and Wall Exhaust Fans.

Name_____

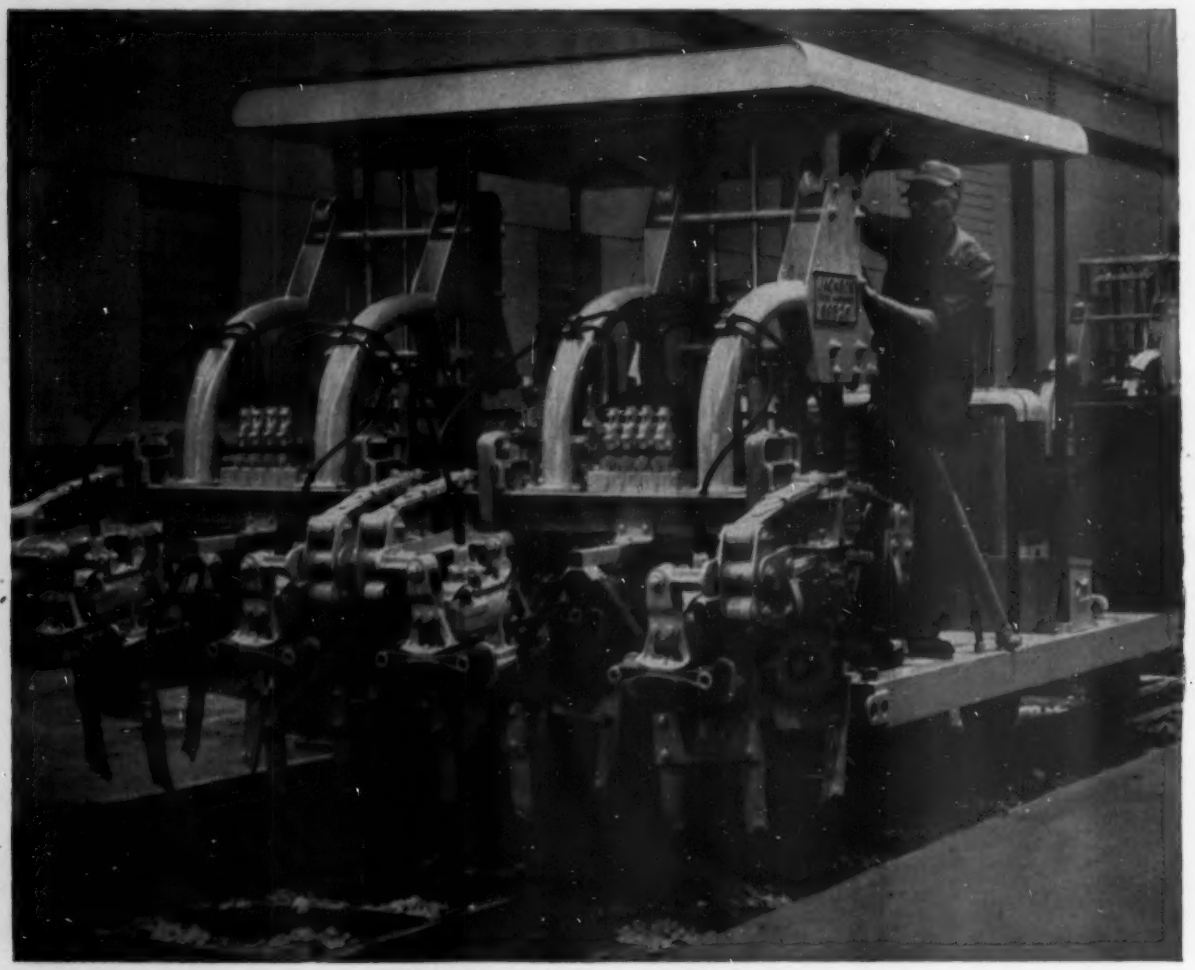
Street_____

City_____ State_____

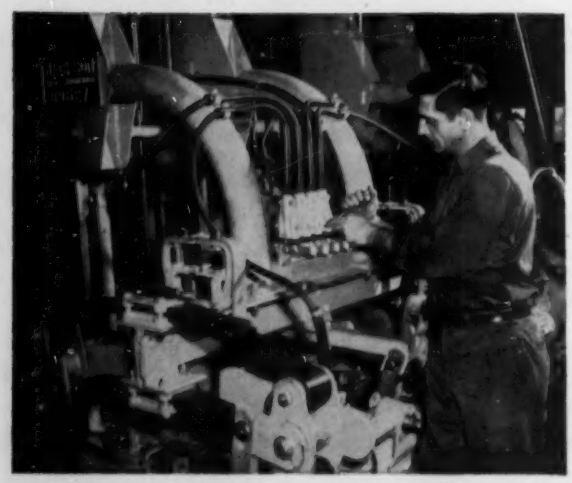
☐ Dealer ☐ Distributor ☐ Contractor

CONSOLIDATED GENERAL PRODUCTS, INC.
West 24th and Nicholson, P. O. Box 7425, Houston 8, Texas
FACTORIES AT:
HOUSTON, TEX. DALLAS, TEX. SAN ANTONIO, TEX. NEW ORLEANS, LA.
ATLANTA, GA. TAMPA, FLA. WAUKESHA, WIS. BRIDGEPORT, CONN.

"Tiger Brand Amerclad is the most



The completely self-contained Jackson Track Maintainer.



Tightening connectors. Machine delivers 4500, 2-ton blows per minute.

Assembling leads. Each vibrator delivers ¼ ton blow.

durable cable we've ever used"

says **ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan**

MANY years ago, the executives at Electric Tamper & Equipment Co. found out that when railroads order a piece of machinery, they expect it to last a long time—without breakdowns. Since then, Electric Tamper has won a high place in industry by producing a line of the hardest-working, *toughest* track maintenance machines on the market.

Leader of the line is the Jackson Track Maintainer, used for tamping ties. It has 8 powerful vibratory motors that drive 8 tamping assemblies. Each motor is powered with Tiger Brand Amerclad cable. The vibration and flexing (which are very severe) caused previous cable to crack until the jackets actually peeled away from the conductors. So they asked American Steel & Wire for advice.

Tiger Brand Amerclad was the solution. Finely stranded conductors soak up vibration and allow greater flexibility than ever before. The tough, well-cured jackets are impervious to oil, grease and the burning sun.

In the company's own words, "Tiger Brand cable is certainly superior to anything we have ever seen for this class of service. Its complete dependability under all service conditions has definitely helped us to maintain our good reputation in the field."

Do you want a *better* electrical cable—engineered for your equipment? Just call your American Steel & Wire representative.

The Jackson Multiple Compactor for consolidation of granular soil.

Hand Vibrospade. Cable usually drags on the ground.

Small compactor. See why they need durable cable?

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- machine tool and building wire
- special purpose wire and cable
- asbestos wire and cable
- paper and varnished cambric cable
- aerial, underground and submarine cable
- shovel and dredge cable
- mold cured portable cord

USS

UNITED STATES STEEL

New high school for a southern city...

WIRE BY PHELPS DODGE

This modern new Senior High School in Gainesville, Fla., one of the finest in the state, is smartly designed to handle both present and future student enrollment needs. One-third more students can be accommodated merely by adding extra classrooms to the present structure. The school's auditorium, gymnasium and cafeteria were constructed to provide for this future expansion of the student body.

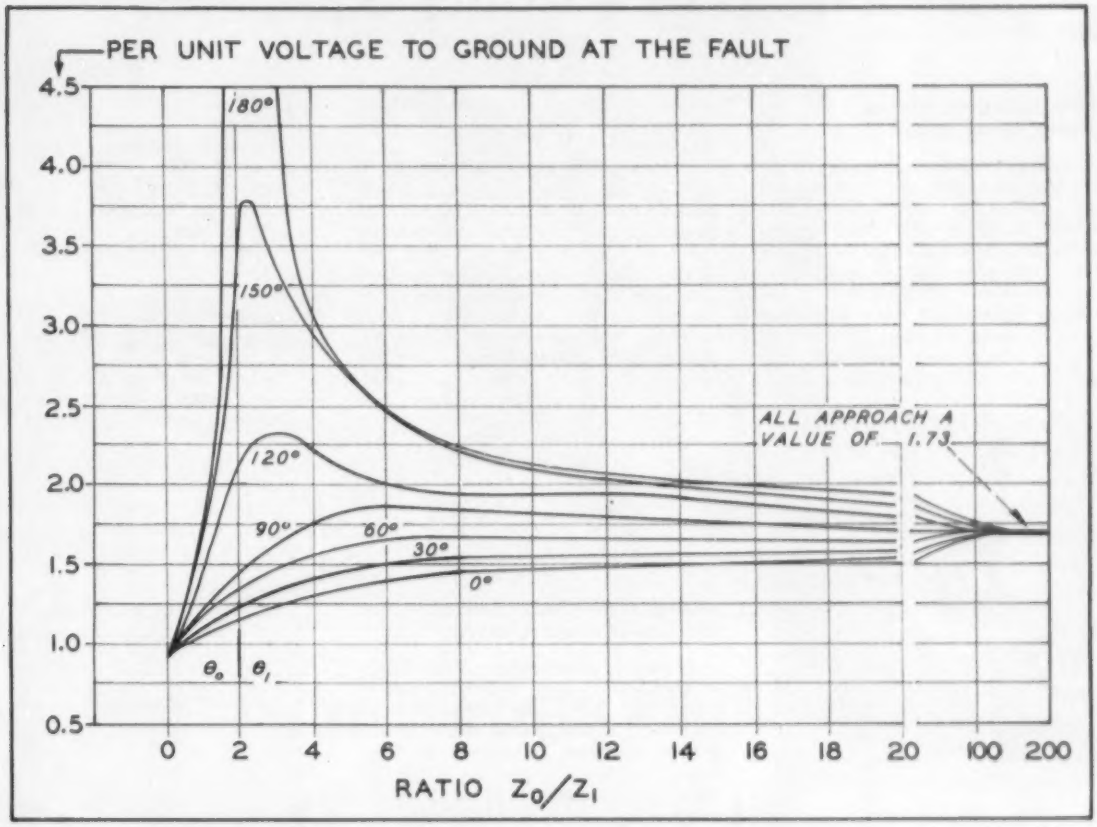
To assure dependable, trouble-free electrical service at all times, Phelps Dodge wire and cable was specified and installed throughout this distinctive school.

* * *

On every wiring job, large or small, where top quality materials, expert workmanship and experienced "know-how" are called for, *it pays to rely on Phelps Dodge and your Phelps Dodge distributor!*

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.



OVERVOLTAGE EXPECTED ON TWO UNFAULTED PHASES AS A RESULT OF LINE-TO-GROUND FAULT ON THE THIRD PHASE OF A 3Φ CIRCUIT.

by Ralph R. Taggs

The accompanying chart provides an easy method of determining the overvoltage resulting from a line-to-ground fault. It covers the range of possible system impedance for both grounded and ungrounded systems. In addition it may aid in application of lightning arrestors to protect equipment from transient overvoltages.

The chart gives the higher voltage to ground that may be expected on two unfaulted phases with a ground on the other phase-conductor of a three-phase circuit. The higher voltage is a function of Z_0/Z_1 and $(\theta_0 - \theta_1)$ and is expressed in per unit of system voltage to ground that exists at time of fault.

In deriving curves, assumptions made are: fault impedance = 0; and positive and negative sequence impedances are equal, i.e., $R_2 = R_1$ and $X_2 = X_1$. Therefore, it is necessary to know only positive- and zero-sequence impedances at the fault point. An example shows how the chart can be used.

Example for use of chart

Refer to the diagram. Impedances on 20 Mva (20,000 Kva) base, for the system components, are:

Transformer T_1: $X_1 = 7.5\%$; $X_0 = 6.5\%$ resistance neglected.

Transformer T_2: Same as Transformer T_1.

66 kv line: $X_1 = 17.2\%$; $R_1 = 6.35\%$; $X_0 = 66.6\%$; $R_0 = 12.85\%$.

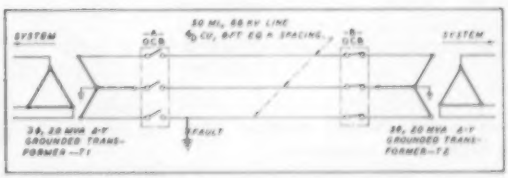
System: $X_1 = 1.5\%$; R_1 is neglected; $X_0 = \infty$; $R_0 = \infty$

Solution

With circuit breaker "A" open, positive and zero sequence impedances at the fault are:

$Z_1 = R_{1\text{-line}} + j\ (X_{1\text{-line}} + X_{1\text{-transf.}} + X_{1\text{-system}})$

$= 6.35 + j\ (17.2 + 7.5 + 1.5)$



$= 6.35 + j\ 26.2$

$= 26.9/\underline{76.4^\circ}$

$Z_0 = R_{0\text{-line}} + j\ (X_{0\text{-line}} + X_{0\text{-transf.}})$

(Note: System is isolated from zero sequence path by its delta connection.)

$= 12.85 + j\ (66.6 + 6.5)$

$= 12.85 + j\ 73.1$

$= 74.1/\underline{80.1^\circ}$

Then the ratio Z_0 to Z_1 is:

$Z_0/Z_1 = 74.1/26.9 = 2.75$

And the absolute value of $\theta_0 - \theta_1$ is:

$(\theta_0 - \theta_1) = (80.1 - 76.4) = 3.5$ deg

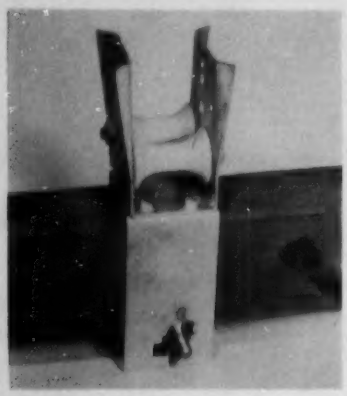
From the chart the higher of the two unfaulted phase voltages is found to be 1.24 times the voltage that existed before the fault occured. RESULT: Therefore, if voltage at time of fault was 66 kv line-to-line, then the voltage to ground during the fault is: (66/1.73) x 1.24 = 47.2 kv.

Notes on new utility equipment

Cable stringing blocks feature nylon spools

UNIVERSAL cable stringing blocks with Dupont molded nylon spools for large aluminum and copper conductors, large weatherproof cables and cable supports, aerial cable supports, and large bus supports, have been announced by Distribution and Hi-Line Specialties Co., 2100 Del Norte, St. Louis 17, Mo.

These blocks are sturdily built, light weight, and adjustable to fit all



standard cross arms. The extreme toughness of the nylon spool assures a longer life under adverse service conditions. Bus cables and insulating sheaths are protected from chaffing due to loading change movement. Utility investment is protected by assuring faster, safer stringing jobs.

Chance side-break switch for high fault currents

A. B. CHANCE Co., of Centralia, Mo., is now offering an all-new, all-weather rotating-stack side-break switch, designated Type "S." Based on an extensive study of actual field needs, Type "S" switches combine easy installation and operation with the high mechanical strength and thermal capacity necessary to with-

stand, without damage, the extremely high fault currents possible on today's systems.

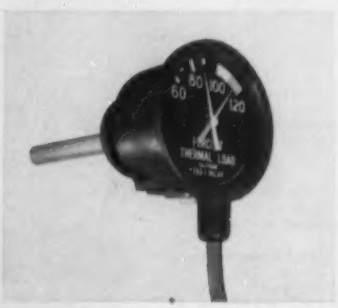
Features include high-pressure, self-wiping, silver-to-silver contacts; braidless current path; sealed, greaseless ball bearings of stainless steel in stainless steel races; and sealed high-pressure, silver-to-silver permanently lubricated hinge contacts.

These switches can be obtained for horizontal upright, vertical, or underslung mounting. They are available in the following ratings: 400 amperes, 7.5 kv through 34.5 kv; 600 amperes, 7.5 kv through 69 kv; 1200 amperes, 7.5 kv through 69 kv. Type "S" switches conform to all applicable NEMA, AIEE, and ASTM standards.

Improved thermal relay for power transformers

A NEW thermal relay (Type TRO-1) with an overload indicating dial is available from the Westinghouse Electric Corporation for use on power transformers of all types. It combines overload protection with the automatic starting of cooling equipment.

The device consists of a bimetallic element, a relay, and a 5½-inch indicating dial. It is mounted in an oil-



tight well in the transformer wall with the relay and dial projecting.

The bimetallic element is heated by both the top oil and by a heater coil that carries a current proportional to the load in the main winding. The element is designed to drive the dial pointer directly without use of intermediate gears.

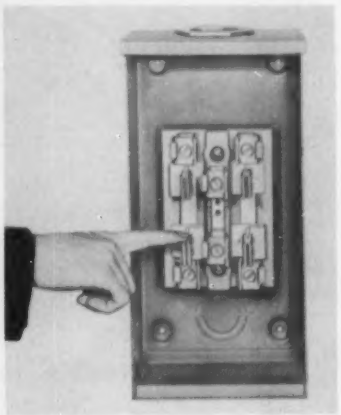
The dial has two pointers. A yellow one indicates continuously the operating position of the relay relative to the zones of unsafe operation and also gives a reference reading expressed in "per cent thermal load." A red "maximum" indicator is resettable and registers the highest attained position of the yellow pointer since the last resetting.

The relay has three main contacts for successive operation of fans, pumps, and an alarm or circuit-breaker trip. It will operate on either a-c or d-c with a control voltage up to 250 volts.

Square D designs new meter socket

RECENT developments in watthour meters allow accurate metering on services up to 200 amperes with current passing directly through the meter. This eliminates the cost of meter transformers and their cabinet.

Square D has designed a Type S socket specifically for this new application. It has a 200 ampere con-



tinuous rating without overheating and is available with full rated circuit closers. Lay-in type lugs accept up to 300 MCM wire. Current-carrying jaws are silver plated and spring loaded, eliminating the need for clamping or bolting the jaws closed. This jaw construction is identical to that used in Square D's heavy duty industrial switches. The enclosure is available for surface or semi-flush mounting for plaster-stucco, wood-siding or brick veneer construction.

This heavy duty socket economically fills a badly needed gap for the larger home and small commercial building. For complete details, write Square D Company, 6060 Rivard Street, Detroit 11, Michigan.

Moloney sled-type transformer base

MOLONEY Electric Company, of St. Louis, announces the fabrication of a new sled-type base for substation-

Mount just one box and the complete service entrance system is neatly installed.

New G-E 12 circuit load center has 100 ampere main breaker wired right in. It accommodates 12 single-pole or 6 double-pole circuit breakers or any combination of both. U/L listed.

Installation is compact and simple with the new G-E 12 circuit load centers, Catalog Number TRM 1210F (flush mounting) and TRM1210S (surface mounting). This is your answer for good looks and better workmanship.

Fronts with doors are standard equipment. Locks are optional.

New G-E combination load center with 100 amp main breaker eliminates separate disconnect, gives you 7 quality extras.

You get all 7 quality extras at no extra cost

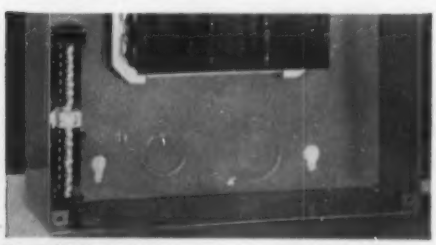
Automatic 2-way alignment. Spring mounted interior assures alignment of breakers with cover and cover with plaster in flush mounting. No screws to adjust.

Silver plated copper for current-carrying parts insures cool, efficient operation for long life.

Bonderite* treated. Bonderizing bonds paint to steel . . . the surface is rust-resistant and satin-smooth. A G-E exclusive!

Full-length door with provision for optional lock kit is standard equipment. Another G-E exclusive!

Excellent appearance made possible by quality construction and finish.



Straight-in wiring on all connections. Insert, tighten screw; no looping. Grips like a bear trap.

Snap-in installation. Plenty of working room! Interior snaps in spring mounting . . . no screws.

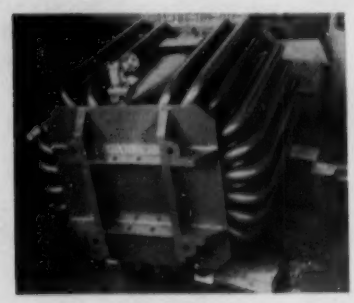
*Parker Rust Proof Co.

For more information see your G-E Trumbull distributor or write General Electric Company, Trumbull Components Department, 49-63 Woodford Avenue, Plainville, Connecticut

GENERAL ELECTRIC

type distribution transformers (225, 333 and 500 kva). The base has steel runners that allow the transformer to slide easily in any direction over all surfaces.

The new sled base is higher than former bases yet actually stronger due to steel channel construction. Continuous welds secure the base to the transformer bottom plate and

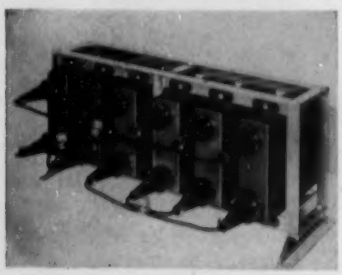


also prevent corrosion at the joints. Base members have holes to provide ventilation preventing condensation and corrosion.

Gussets strengthen the corners of the base plate for jacking. The corners of the base plate are open above and below the plate to allow sufficient space for jack clearance, and to make it possible to use the type of jack generally available. Holes are provided in each gusset so the transformer can be guided or pulled in any direction.

Submersible capacitors offered by Line Material

SUBMERSIBLE capacitor equipments, offered by Line Material Co., Milwaukee, Wisc., are designed for secondary network applications. The new equipments are available in either 40-, 80-, or 120-kvar banks and are rated 216 volts, three phase. They are mounted in a supporting structure for installation in underground network vaults. These equip-



ments, applied when low power factor load increases, will postpone or eliminate expensive changes in the network system.

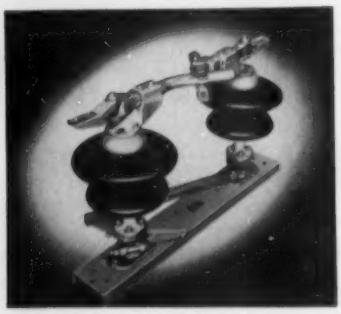
The new equipments are designed for minimum space requirements and can pass through a 30-inch diameter manhole opening. They can be stacked a maximum of three tiers high and can be floor-, wall-, or ceiling-mounted in various arrangements to fit the limited space available in network vaults. Ambient temperature limits are 55°C for single tier equipments and 40°C for two- or three-tier equipments.

Each equipment consists of a group of single-phase capacitor units rated at 13⅓ kvar, 216 volts, with one terminal-mounted current-limiting fuse. The terminals are enclosed in Neoprene covers made watertight by clamps at both ends. The L-M process of aluminum metallizing capacitors is used to provide lifetime corrosion protection to the sturdy steel tank. The finish is completed with a coat of primer and final coat of blue-gray alkyd resin paint.

Braidless side-break switch with high pressure contact

DELTA-STAR Electric Division, H. K. Porter Company, Inc., has announced a new line of braidless side-break switches featuring new high pressure contacts throughout and low friction swivel terminals.

Braids are completely eliminated by means of newly developed high



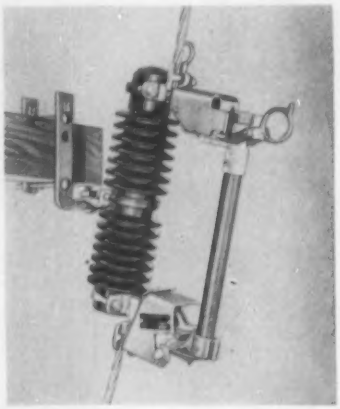
pressure "on center" contacts at all rotating contact points. These new switches include center-break, single-break, and double side-break switches in a wide range of voltage and ampere ratings to 1200 amperes as well as both standard and heavy fault ratings.

New type cutout result of design recommendations

A. B. CHANCE Co., of Centralia, Mo., is introducing a completely new open-type drop-out cutout — designated Type "F"—that features interchangeable fuseholders. Type "F" cutouts are available in 5.2, 7.8, and 15 kv ratings at 100 and 200 amps. Maximum interrupting capacities of regular cutouts range from 2,000 to 12,000 amperes; loadbreak cutouts, 2,000 to 10,000 amperes.

The fuse mountings and fuseholders that make up Type "F" cutouts are available individually. One hundred and 200-amp fuse mountings are the same except that heavier contacts are used in the latter. Fuseholders of the same ampere and voltage ratings can be used interchangeably. Thus, it is a simple matter to convert a Type "F" cutout to any interrupting capacity rating by merely installing a new fuseholder.

A contact conversion kit is available for converting 100-amp fuse mountings to 200-amp ratings. Ex-



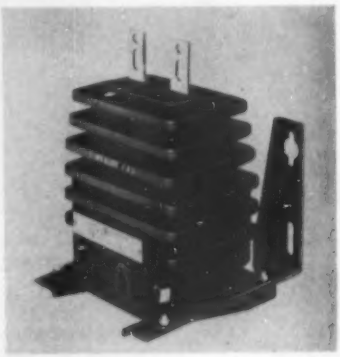
pendable caps can be obtained for doubling the interrupting capacities of certain fuseholders.

Type "F" cutouts are a direct result of design recommendations made by utility engineers across the country. They conform to all applicable EEI-NEMA standards.

G-E transformer features Hy-Bute/60 insulation

THE FIRST high-voltage current transformer to be molded with Hy-Bute/60 insulation—General Electric's new non-tracking organic material—has been announced by the company's Instrument Department at West Lynn, Mass.

Designed for outdoor metering and relaying applications, the 15,000-volt JKW-5 is a three-in-one model, according to department general man-



ager Edwin E. Parker, since it not only replaces three existing models, but can also be mounted vertically, horizontally, or inverted to place the primary terminals in any desired position.

A TOAST TO THE FINEST LIGHTING—ANYWHERE!

Here's to another fine example of store lighting — Desmond's of Pasadena, California. Various Sunbeam Visionaires® were specified and installed to achieve a balanced, high-intensity, low-brightness illumination for maximum sales appeal and customer comfort. Sunbeam's 4′ x 4′ recessed "large area" HL3800 series was selected for its contemporary design and efficient, minimum glare lighting. Recessed incandescent units with square prismatic lenses were used in the sales areas for warm tone accents. Indirect cove lights give added emphasis to display areas. Here's also to architect H. J. Nicolais, A.I.A., of Burke, Kober and Nicolais and to M. J. Garris, E. E., for a highly successful store design and lighting installation.

SUNBEAM visionaire

SUNBEAM LIGHTING COMPANY, 777 E. 14TH PL., LOS ANGELES 21, CALIFORNIA

Until the development of Hy-Bute/60 insulation, Parker said, construction of molded instrument transformers for outdoor use was limited to lower-voltage types because organic materials like ordinary butyl are susceptible to damage from high-voltage electrical discharges on their surface. Hy-Bute/60 insulation is a butyl rubber formulation strengthened by a chemical mechanism that prevents formation of free carbon under such conditions. The new organic material eliminates the carbon tracking that occurs on the surface of ordinary organic insulations when subjected to severe electric arcing.

The JKW-5 does away with metal casings and porcelain bushings, which means a smaller, lighter transformer requiring virtually no maintenance and far less susceptible to mechanical damage than older types. The entire exposed surface of the JKW-5 is completely corrosion-resistant with the Hy-Bute/60 insulation acting also as casing and support. Base plate and secondary cover are stainless steel, and terminals are silver-plated copper.

The secondary terminal box is molded in the case as an integral part of the transformer, and the stainless-steel cover provides watertight protection.

Primary and secondary coils are of the "figure 8" type, which provides a high degree of mechanical strength. Low core losses and high accuracy result from the interleaved, high-permeability, silicon-strip steel core.

Westinghouse switch solves cold load pick-up problems

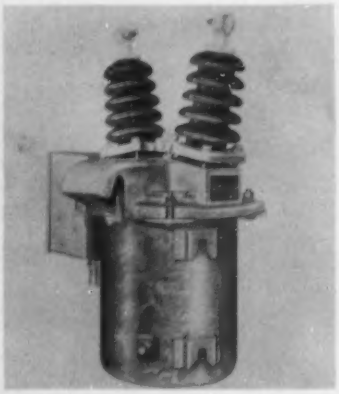
A NEW LOAD pick-up switch (Type LP) that serves as an automatic load-shedding and load-restoring device is available from the Westinghouse Electric Corp., Pittsburgh, Pa. Rated at 15 kv, 200 amperes, the switch may be used for all voltages 2.3 kv to 14.4 kv, single phase or three phase.

The new switch is used to solve cold load pick-up problems on circuit breaker and recloser protected systems. The voltage-sensitive switch automatically sheds the load it controls following a two-minute loss of system voltage. It closes to pick up the load increment with adjustable time delay up to five minutes following restoration of voltage.

By using different time delays, load pick-up switches on two or more feeders can be made to close in at different times, holding down inrush current. The thermal plug-in type close-in relays are available with delays from 30 seconds to 5 minutes.

Since the switch is not current sensitive, any arrangement of fuses, reclosers, or sectionalizers can be used in the line sectionalizing or protective scheme.

The LP can be supplied as a single-



pole device for crossarm or direct pole mounting. Plug connectors are supplied to facilitate connecting the 110 volt control source. When supplied as a three-phase unit, three load pick-up switches are shipped channel-mounted and wired. A junction box on the channel permits easy connection of the control wiring.

69-kv oil circuit breakers designed by Federal Pacific

NEW 69-kv oil circuit breakers, rated at 2000 amp, 350C mva and 5000 mva, with 5-cycle interrupting time and 20-cycle re-closing time, have been announced by the Pacific Switchgear Division, Federal Pacific Electric Co., San Francisco, Calif.

The new breakers, designated as type AJ-54, feature improved expul-

sion interrupters; simple multi-set six-shoe sliding solid-silver to solid-silver contacts; wide separation of load break and arcing-break; non-critical closed position adjustment; and interrupters without self-charged springs.

The oil-hydraulic accumulator-type operating mechanism eliminates the need to remove moisture or frost from lines. Unusually complete use of hydraulics improves operation, particularly elimination of end-of-stroke shock. The mechanism provides direct line drive with main opening springs on pull-rod end and kick-off springs at each pole. Because of use of stored-energy operating mechanism, emergency manual closing is always at full speed under full force—as is required for complete operator safety.

Kyle 400-ampere Type R recloser

THE NEW Kyle Type R oil circuit reclosers are now available with a continuous current rating of 400 amperes. This new rating extends the application possibilities of the circuit interrupters and provides a broader selection of continuous current ratings. The complete Type R family includes units rated at 25, 35, 50, 70, 100, 140, 160, 185, 225, 280, and 400 amperes, 4.8 through 14.4 kv.

Type R reclosers are designed for application in substations or on heavily loaded feeders where high fault currents may be expected. They have a maximum interrupting capacity of 6000 amperes symmetric and a two-cycle clearing time. BIL is 110 kv.

All Type R reclosers are available with accessories that enable their use as remote-controlled circuit interrupting devices, and are manufactured by Line Material Co., Milwaukee 1, Wisc.

Load-tap-changing mechanism cuts maintenance and noise

A COMPLETELY redesigned load-tap-changing mechanism provides reduced maintenance, quieter operation, and longer contact life in General Electric medium transformers and small, three-phase voltage regulators, according to the company's Power and Medium Transformer Departments.

Thorough laboratory tests show the peak operating noise of the new mechanism is 20 decibels quieter than the old type. It requires only half as much maintenance.

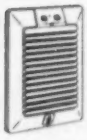
Factors contributing to this improved performance are a redesigned Geneva gear (the device that transmits rotary motion of the driving pin into intermittent motion of the switch shaft). Driving pin enters the gear exactly parallel to the gear slot, instead of at a 19° angle as in the previous design. Operation is smoother and quieter, with virtually no wear.

Two hydraulic dashpots act as shock absorbers to slow the action of the Geneva gear driver, near the end of its cycle, so that switch contacts close smoothly with a minimum of "bounce," vibration, and secondary arcing. Contact life is doubled, according to laboratory tests.

Oil immersion of whole mechanism is in one compartment. Switches, Geneva gear, springs and drive motor are completely covered with insulating oil to muffle noise, lubricate moving parts, and fill the dashpots' hydraulic cylinders.

Install THERMADOR

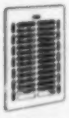
Bilt-in Electric Wall Heaters



"Master Duty" Wall Heat-Fan

"Medium Duty" Wall Heat-Fan

Bathroom "Head-to-Heels" Radiant Heater



Bathroom "Space Saver" Radiant Heater

Thermador Electric Wall Heaters satisfy all the heating demands of your buyers. A flick of a switch instantly delivers a surge of clean, healthful warmth. Scientifically designed heating element, fan and louvers direct the heat toward the cold floor. From there the heat rises, warming the "Living Zone"... quickly, safely, economically. Room-by-room heat control allows heating of just those areas where heat is desired. Specify and install Thermador... so efficient... so clean... so economical... and the fastest heaters made! There's a type and size for every room.

Fan or Radiant Models • Convenient Top Switches • Optional Thermostat Control • Sun Bronze, White or Stainless Steel Finishes • On-Off Indicator Lights • Approved by Underwriters' Labs., Inc.

"SEVEN LEAGUES AHEAD"

THERMADOR

ELECTRICAL MANUFACTURING CO.

A division of Norris-Thermador Corporation

5119 District Blvd., Los Angeles 22, Calif.

Manufacturers of Bilt-in and Console Electric Ranges, Electric Water Heaters, Evaporative Coolers, Ventilating Fans.

See your nearest Thermador Distributor or call or write:

H. C. BIGLIN CO.
177 Harris Street N.W.
Atlanta 3, Georgia

3-1058H

News of the industry

edited for Southern readers

Annual wiring awards presented by LOOK

THE 1956 WINNERS of the Adequate Wiring Awards, presented each year by LOOK Magazine, were announced at the 12th Annual Conference of the National Adequate Wiring Bureau held in Chicago recently.

Four Award trophies and one Special Citation plaque were presented to members of the electrical industry by Fred Bauer, vice-president of LOOK, for outstanding achievement in "encouraging improvements in home and business electrical circuits."

In addition, five utility companies received plaques of Honorable Mention for Community Service in recognition of the excellence of their adequate wiring campaigns.

The top awards were made in the four leading categories of the electrical industry: electrical appliance dealers, electrical distributors, utility companies and electrical contractors.

The trophy winners, selected in an industry-wide competition covering all facets of adequate wiring campaigns, are as follows: Electrical Dealer Merchandising Achievement Award to John G. Webster Co., Washington, D. C.; Electrical Distributor Merchandising Achievement Award to Noland Co., Inc., Newport News, Va.; Utility Community Service Award to Philadelphia Electric Co., Philadelphia, Pa., and Electrical Contractor Merchandising Achievement Award to Roland Perron, Ltd., Montreal, Canada.

The plaque awarded as a Special Citation for Merchandising Achievement was presented to the Electrical Contractors of San Diego, Calif.

The utility companies winning Honorable Mention Award plaques for Community Service are: Consolidated Edison Co., New York City; Wisconsin Electric Power Co., Milwaukee, Wisc.; United Illuminating Co., New Haven, Conn.; Houston Lighting and Power Co., Houston, Tex., and Delaware Power and Light Co., Wilmington, Del.

Electrical industry leaders shown receiving Look Magazine awards at National Adequate Wiring Conference for meritorious service performed by their companies during 1955. Left to right are Carleton J. Bunce, Bureau of Home Appliances, San Diego, Calif.; C. P. Andrew, Noland Company, Inc., Newport News, Va.; Roland Perron, Roland Perron, Ltd., Montreal, Canada; Frederick Bauer, vice-president of Look Magazine; Edward R. Webster, John G. Webster & Sons, Inc., Washington, D. C.; and George E. Whitwell, Philadelphia Electric Company.

Heater display shown in Southern cities

A COMPREHENSIVE exhibit of electrical heating products manufactured by the Electromode Corporation has been displayed throughout several southeastern

T. B. Owen, left, of Craig-Owen Co., Chattanooga, Tenn., explains features of Electromode heater to a visitor examining their exhibit.

states by the Craig-Owen Company, manufacturers' representatives of Chattanooga, Tenn., headed by W. T. Craig and T. B. Owen.

The exhibit tour included Atlanta, Birmingham, Macon, Mobile, Montgomery, Pensacola, and Savannah. In each city, the exhibit was set up about the perimeter of a large display room. It included wall heaters, radiant cable heating, industrial units, etc. A buffet supper permitted guests to circulate informally about the exhibit and to obtain information about the products. Visitors included electrical wholesalers, utility company personnel, electrical contractors, and others.

Electrical heating increase predicted

A NEW comprehensive, well-illustrated publication, "How To Insulate Your Home for Electric Heating," was recently published by the National Mineral Wool Association. Prepared at the request

He's coming to help you

He is a Bell System communications engineer. His purpose is to help you speed your operations, cut your costs and improve your service—by making sure your communications meet your exact requirements.

The Bell System offers a wide variety of private line services, including telephone, teletypewriter and mobile radio systems. And the Bell System tailors these facilities to meet specific individual needs, so that you maintain high-speed contact between your various departments, branches, factories, warehouses, as well as between you and your suppliers, customers, distributors and shippers.

Why not let a Bell System communications engineer make a study of your communications requirements and recommend the kind of service, or a combination of services, which will best meet your specific needs?

• • •

His survey is free and his recommendations are yours without obligation. You can reach him by calling your nearest Bell Telephone business office.

BELL TELEPHONE SYSTEM

B-M INDENTER TYPE FITTINGS FOR E.M.T. Concrete-tight

Red Throat
Insulated
Connector

Red Throat
Cross section

Briegel, the Original Indenter Fittings are neater in appearance, easier and faster to use. Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job.

All B-M Indenter Fittings are U.L. Approved as concrete-tight and for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

UL

BM

BRIEGEL METHOD TOOL CO.

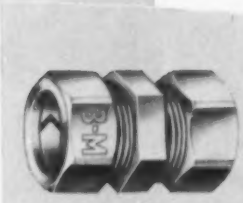
GALVA • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

B-M COMPRESSION TYPE FITTINGS
FOR E.M.T. Rain-tight

SIZES FROM ½" to 2"

SIZES FROM ½" to 2"



SIZES ½" ¾" 1"

SIZES ½" ¾" 1" 1¼"

SIZE ½"

BRIEGEL METHOD TOOL CO.
GALVA • ILLINOIS

and with the cooperation of the National Electrical Manufacturers Association, the booklet predicts that, within five years, more than 100,000 houses heated by electricity will be built annually.

The advantages of electric heating are outlined, as are various types of electric heating equipment now in use, including wall and ceiling unit heaters, self-contained fan types, radiant glass panel heaters, heating cables and panels of conductive rubber.

Insulation standards recommended are four to six inches of mineral wool for ceilings and roofs, three inch batts or blankets for walls, two to three inches under floors, and two inch perimeter insulation when a concrete floor is in contact with the ground. These insulation standards are the same that would be required for economical operation of air conditioning equipment.

Various methods of installing insulation are detailed, as are the proper uses of vapor barriers. Diagrams and photographs illustrate working procedures for floored and unfloored attics, dormers, flat-roofs, attics with finished rooms, sidewalls, floors over unheated spaces, etc.

The application of blown wool is discussed, as is the use of loose fill in attic floors, and the treatment of basements and crawl spaces. Ventilation for various types of roofs and other areas is stressed, and a chart gives recommendations for vent openings.

An example of how mineral wool insulation benefits houses electrically-heated is given in a table of cost figures. These indicate that, for a one-story frame house in a city of approximately 4,560 degree days, and a kw-hr heating cost of 1.5 cents, insulation would mean conservatively, a saving of $178 in cost of heating equipment, and an annual saving of $232 in heating costs.

Single copies of the booklet are available free-of-charge. Quantities are available at five cents each. Write the National Mineral Wool Association, 2906 Americas Building, Rockefeller Center, New York 20, N. Y.

New officers named for Maryland group

FOLLOWING a recent meeting of the Electrical Contractors Association of Maryland, new officers and board of directors were elected.

Louis J. Otremba, head of Louis J. Otremba Co., Baltimore contracting firm, was elected president, succeeding A. Raffel, of Charles Electric Co., who automatically becomes a director. New vice-president is Charles L. Greer, of Charles L. Greer & Co., who has been secretary-treasurer of the association for the past two years. J. D. Mager, of Mager Electric Co., is the new secretary-treasurer.

The directors are E. H. Phillips, S. J. Cornblatt, Fred E. Hilmer, H. E. Phipps, J. C. Henry, and A. C. Kammer.

Virginia utility group announces two meetings

TWO UTILITY industry meetings for this year have been announced by the Public Utilities Association of the Virginias.

Public Utilities Accident Prevention Conference will be held at Hotel Roanoke, Roanoke, Va., June 22. This meeting is sponsored by the Accident Prevention Committee of the association.

The 38th Annual Meeting of the association is planned for September 14-15 at the Greenbrier Hotel, White Sulphur Springs, W. Va. Over 400 persons are expected for this meeting.

Distributors attend NAED conference

DELEGATES of electrical distributor companies from Louisiana, Arkansas, Oklahoma, Mississippi, Texas, and southern New Mexico —all members of the National Association of Electrical Distributors —met recently at the Captain Shreve Hotel, Shreveport, La., to discuss the programs and problems of the electrical distributing industry.

Speakers during the two-day meeting included Joseph Mevis, Nunn Electric Supply Corp., Houston, whose subject was "The Distributor's Warehousing Functions"; Ned A. Breitenmoser, Lighting Fixture & Electric Supply Co., Inc., New Orleans, "Report on the NAED Executive Training Course"; and Austin B. Watson, Watson Electric Supply Co., Dallas, "The Distributor's Stake in the Growth & Development of the Southwest Area."

Other features of the meeting included talks by NAED staff members and open discussion periods designed to provide all members of the area with an opportunity to express their opinions and suggestions on association and industry matters.

Chairmen of the two-day meeting were T. C. Treadway, Jr., Treadway Electric Co., Inc., Little Rock, and Austin B. Watson, Watson Electric Supply Co., Dallas. Arthur W. Hooper, executive director of NAED, and Thomas F. Preston, secretary of field activities, participated in the meeting.

Motor repair theme of NISA convention

"How To Wind It, How To Cost It, and How To Sell It"—referring to the repair of motors and other electrical equipment—will be the theme of the National Industrial Service Association's 23rd Annual Convention, to be held May 13-16 in Philadelphia.

More than 1,000 members of "NISA," the trade association representing electric motor, generator, and transformer service and sales shops in the United States and Canada, are expected to attend the four-day meeting at the Bellevue-Stratford Hotel. The convention's program will cover all phases of service shop operations. A total of 65 industry leaders are scheduled to appear as speakers, moderators and panelists.

The program includes six technical papers, two during each of the morning sessions Monday through Wednesday, May 14-16. Subjects include interspersed windings, coil winding, winding formulas, fractional horsepower motors, cost factors, and motor marketing. Speakers will meet with members each afternoon in forums which will be held on the subjects of winding, selling, costing, fractional horsepower motors, and transformers.

Petroleum groups plan 28th joint conference

THE 28TH ANNUAL Joint Conference of the Petroleum Industry Electrical Association and Petroleum Electric Supply Association will be held in the Statler Hilton Hotel, Dallas, Texas, May 1-3.

The technical program is designed to be of general interest and includes papers on power, atomic power, data processing, and various phases of communications developments. Sixty-five manufacturers and distributors will display electrical power and control apparatus, and communication and electronic equipment. Attendance is expected to be more than 1000.

General chairmen are: for PIEA, J. R. Ashley, Magnolia Pipe Line Co., P. O. Box 900, Dallas 21, Texas, and for PESA, John Metzenthin, Crouse-Hinds Co., Thomas Building, Dallas 2, Texas.

Home lighting sales increase 25% in 1955

SALES OF residential lighting fixtures zoomed upward 25 per cent in 1955, according to a survey completed by the American Home Lighting Institute.

The institute, comprised of major home lighting fixture manufacturers, reported that sales are expected to increase another 12 per cent during this year.

Authoritative dollar figures were not available. Based on conservative Commerce Department figures indicating a $62,000,000 volume in 1954, the total for 1955 would be $77,000,000. Estimated volume for this year would be $86,000,000.

The survey covered 55 manufacturers and 164 top distributors. Both manufacturers and distributors credit aggressive promotion and display for the lion's share of the increase, giving second-place credit to high home building levels.

While fixture makers think promotion will continue to contribute to the sales curve in 1956, distributors are relying heavily on home building to keep up their momentum.

According to AHLI, it is significant that few or no manufacturers or distributors single out the remodeling or replacement market as helping the fixture cause, "in spite of the fact that the 20 million and more homes in this category are most urgently in need of better lighting."

Street lighting program provides safety, beauty

CONTINUING it's policy of improving street and highway lighting in the City of Victoria, Texas, the City Council recently installed mercury vapor lights on one of its principal thoroughfares.

The lighting, on U. S. Highway 59, consists of 48 21,000-lumen mercury vapor lamps using General Electric Form 400 luminaires. The highway entering the city from the east is extra wide converging into a boulevard, and on this section the luminaires are mounted on 15-foot brackets at a height of 25 feet. Leaving the boulevard section the highway narrows for the remainder of the way through the city, and on this section the luminaires are mounted on six-foot brackets.

U. S. Highway 59 through Victoria is heavily traveled, making the new lighting more important. Safety has been enhanced, traffic moves faster, and a touch of beauty has been added to the thoroughfare.

The lighting was installed by the Central Power and Light Company for the city on a contract basis. Mayor Cliff Berkman officiated at the "turn-on."

Mayor Cliff Berkman gives the order turning on the lights while J. B. Wilson, CP&L Victoria manager, looks on.

The boulevard section of U. S. Highway 59 through Victoria, Texas, after the 21,000-lumen mercury vapor lights were installed.

L-M to distribute fiber glass products

SELECTION of Line Material Company to be the distributor of a new line of fiber glass products was announced recently by E. F. Fisher, president of Gar Wood Industries, Inc. The new line, under development by Gar Wood since 1954, is being designed for applications in the electric utility, communication, and construction industries. Mr. Fisher said L-M was selected because of its knowledge of these industries, its engineering capabilities, and its sales services.

According to Mr. Fisher and R. G. Wheaton, L-M president, Gar Wood and Line Material will work together in the development of new products. Long established in the pole line hardware business, L-M will also enhance the applicability of the new line by designing and manufacturing suitable hardware.

Although not immediately available, the first products to be offered will be crossarms and appurtenant hardware for installation on existing utility and telephone poles. Future products will include poles, conduit, highway structures, and several other related items.

Chapman represents Clayton Mark & Co.

THE APPOINTMENT of Cary Chapman & Company, 672 Whitehall St., S.W., Atlanta, as Southeastern sales representatives has been announced by Clayton Mark & Company, Evanston, Ill., manufacturers of water well supplies and electrical equipment.

The Atlanta firm will represent Clayton Mark & Company in the electrical field with rigid steel conduit and electrical metallic tubing.

ACT type cable gets UL approval

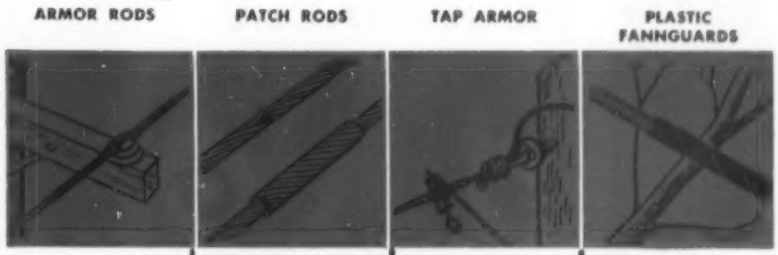
FOR THE first time armored cables with thermoplastic-insulated conductors have been evaluated successfully by Underwriters' Laboratories.

Cables of the ACT (armored cable, thermoplastic) type, recently submitted to Underwriters' by three manufacturers, have been tested and found acceptable. These products now have official UL recognition and consequently are eligible for the UL label service.

Each of the cables receiving recognition had conductors insulated with electrical grade Opalon vinyl chloride, a thermoplastic compound which complies with

Fanner Superformed LINEGUARDS give short span distribution lines complete protection against abrasion, arcover, or clamp or tie wire damage at lowest possible cost. They have the same features of ease of installation, lasting durability and reuseability as Fanner ARMOR RODS, but are smaller in wire size and shorter, therefore cost far less: It's good economy to use Fanner LINEGUARDS on short spans with low tensions (1) at support points to protect against clamp or tie wire damage, (2) to provide a protective layer for tapping purposes, (3) at expulsion-gap or other critical locations. Further information and prices on FANNER Superformed Lineguards will be furnished on request. Write today.

Other FANNER ELECTRICAL LINE PRODUCTS



ARMOR RODS	PATCH RODS	TAP ARMOR	PLASTIC FANNGUARDS
• For protection against vibration damage and also good for emergency repairs on partially broken overhead lines.	• Act as a "repair sleeve" for conductors having up to about ¼ of the wires broken in the outer layer.	• Provides a protective layer of shortened rods on conductor for making taps without risking damage to conductor.	• Tough, durable spiral wound plastic sleeves that snap together over covered wires and cables to provide protection against tree abrasion.

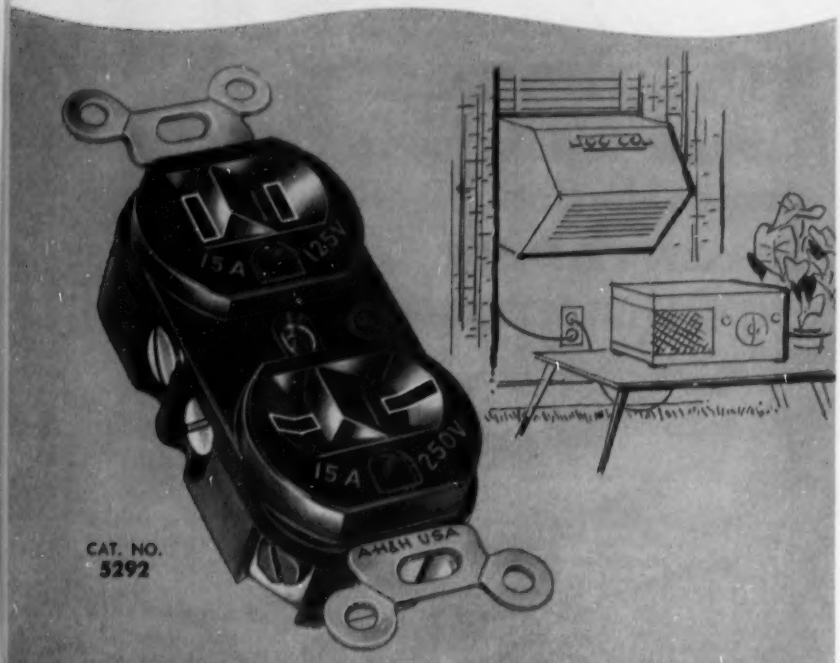
Licensed for use under Patent No. 2,275,019

Fine Fanner Superformed

THE FANNER MANUFACTURING CO.
Electrical Products Division
Brookside Park Established 1894 Cleveland 9, Ohio

AGENTS IN PRINCIPAL CITIES

Simplifies your
air conditioning installations



LISTED AS STANDARD BY UNDERWRITERS' LABORATORIES

New

ARROW AH HART

COMBINATION
Duplex Grounding
RECEPTACLE

for BOTH 15 AMP 125 VOLT AND
15 AMP 250 VOLT SERVICE

Tie two circuits into one receptacle, one wall box. Install the ONE receptacle that will supply 15 amp – *250 volt* service for air conditioning units as well as 15 amp – *125 volt* power. Polarized slots make it impossible to plug an appliance into the wrong circuit.

Only Arrow-Hart makes it. Only Arrow-Hart distributors sell this new Combination Duplex Receptacle that will make your new or re-wiring installations easier . . . faster . . . more economical!

Write for Catalog Page 26-G.

ARROW AH HART

Wiring Device Division
THE ARROW-HART & HEGEMAN ELECTRIC CO.
103 Hawthorn Street, Hartford 6, Connecticut
Offices, Sales Engineers and Warehouses in Principal Cities

Quality WIRING DEVICES • MOTOR CONTROLS • ENCLOSED SWITCHES • APPLIANCE SWITCHES

the Type T requirements of the National Electrical Code. Opalon is a product of Monsanto Chemical Company.

Although the National Electrical Code, since 1947, has provided for ACT-type construction in armored cables, prior to the recent tests Underwriters' Laboratories had not successfully evaluated such a product.

Martin G. Caine, sales manager of vinyl resins and compounds for Monsanto's Plastics Division, said that UL recognition would help establish armored cable with vinyl insulated conductors as a standard.

"Because of its high durability, vinyl insulation has been used for many years in building wire and other electrical applications. In the armored cable field this durability will be equally important," Mr. Caine said.

He also pointed out that vinyl insulation strips easily to permit neater installations in junction boxes and because the color is homogeneous it cannot wear off to make identification of the conductors a problem.

Individual conductors in the new cables are wrapped with 30-lb., wax-impregnated Kraft paper, applied with an overlap of about 50 per cent. Each cable contains an aluminum bonding strip.

The ACT-type cables were developed by Columbia Cable & Electric Corp.; Clifton Conduit, Inc.; and Ettco Wire & Cable Corp. The companies worked in cooperation with Monsanto's Plastics Division.

Home air-conditioning increases 68% in 1955

AT LEAST 130,000 U. S. homes were completely air-conditioned with central cooling units during 1955, an increase of 68.5 per cent over the 77,150 residences air-conditioned the previous year, according to the Air-Conditioning and Refrigeration Institute.

The central air-conditioning plants installed in homes were in addition to the 1,300,000 room air-conditioner units sold at the consumer level in 1955, an increase of 30 per cent over the previous year.

George S. Jones, Jr., managing director of the institute, said that the 130,000 figure for central cooling units is probably conservative, but that a more accurate figure would be difficult to get. The total given is based on manufacturers' shipment figures.

"The air-conditioning industry," he said, "is making rapid strides toward further improvements in equipment and economy of operation. Architects and builders are using their know-how to lower

construction costs by designing homes to take full advantage of air-conditioning. The cooling equipment manufacturers are making every effort to produce cheaper, quieter and more efficient units."

Mr. Jones predicted that the sales of central air-conditioning units would break all records in 1956. "The mass production of the central units has brought about a reduction in the cost of home cooling. This may mean that air-conditioning will become standard throughout the country for new dwellings."

Mill-Power appoints new representative

J. E. "BUCK" MANESS has been assigned to the Charlotte, Salisbury, and Gastonia, N. C., territory

J. E. "Buck" Maness

as representative for Mill-Power Supply Co. The announcement was made by B. Merritt, sales manager. Mr. Maness was formerly in the Quotation Department of the Charlotte electrical supplies firm.

Sylvania reflector lamp increases downward light

A NEW TYPE fluorescent lamp with an internal reflector surface resulting in 70 per cent more downward light, has been announced by Sylvania Electric Products Inc.

The new lamp, developed by Sylvania engineers, marks the first attempt by an American lamp manufacturer to market a fluorescent lamp with directional light distribution, according to Lawrence P. Pleasants, merchandising manager of the company's Lighting Division. He stated that initial tests have shown the lamp to have remarkable advantages under various service conditions.

An important application of the new lamp is in installations where dust or dirt are present. Significant improvements in lamp lumen-hours are obtained because the

SMALLEST in SIZE
BIGGEST in FEATURES

15 AMPERE — 120 VOLT AC ONLY
LISTED AS STANDARD BY UNDERWRITERS' LABORATORIES

ARROW AH HART

Junior Quiette SWITCHES

SCREW OR SCREWLESS TERMINALS

You'll like the Junior Quiette Switch for its small size that means ample wiring room . . . for the built-in shunts in some models that eliminate splicing . . . and a choice of either Binding Screw or Screwless Wire-Lock Terminals, as you prefer.

And when you add to these time-saving and money-saving advantages, features like noiseless operation, silver alloy contacts, an "L" rating for 15 amperes, 120 volts, you'll agree A-H Junior Quiette Switches are a must on the next job . . . and all jobs to follow.

Available in single pole, double pole, 3-way and 4-way with Ivorylite or Brown handles. Listed as standard by Underwriters' Laboratories.

Write for free folder (Form A-198), "A-H Quiette Switches Meet Every Lighting Requirement."

ARROW AH HART

Wiring Device Division
THE ARROW-HART & HEGEMAN ELECTRIC CO.
103 Hawthorn Street, Hartford 6, Connecticut
Offices, Sales Engineers and Warehouses in Principal Cities

Quality WIRING DEVICES • MOTOR CONTROLS • ENCLOSED SWITCHES • APPLIANCE SWITCHES

HERE'S ANOTHER WAY...

Preformed Guy-Grips
CUT GUYING COSTS!

EXAMPLE:
Consider a 40-foot guy—with breaker—using 3/8" Siemens-Martin strand—rated at 6950 lbs.

by using
PLP GUY-GRIPS

Strand is terminated here
(no looping required)

1. Since PLP Guy-Grips eliminate looping, strand saving of 12 feet or more per guy results.
SAVING: $.67 per guy

2. Substitute 1/4" Extra High Strength Strand — rated 6650 lbs. PLP Guy-Grips make this possible since they hold the full rated strength of E.H.S. Strand. The following strand savings result (current cost of 1/8" galvanized strand is $2.24 per guy while 1/4" E.H.S. costs $1.36 per guy)*:
SAVING: $.88 per guy

TOTAL STRAND SAVING ALONE $1.55 per guy

3. Preformed Guy-Grips cost only $.55 each for 1/4" E.H.S. Strand size. (PLP Cat. No. 25 GDE-1/4")
Compare this cost with your current fitting.

In every Preformed Guy-Grip installation, you hold the full strength of the strand.

PLUS LABOR SAVINGS

☑ CHECK THESE ADDITIONAL SAVINGS:

- ✓ With PLP Guy-Grips, leading utilities estimate installation savings upward of 50%.
- ✓ Save an additional 10% by using 3-wire strand instead of 7-wire. PLP Guy-Grips will hold 3-wire strand equally well.
- ✓ Save space and inventory costs by standardizing on PLP Guy-Grips and lighter E.H.S. Strands. One size strand can be substituted for several sizes and grades previously used.

Let us give you more information on their exclusive advantages. Write or call Preformed Line Products Co.: Call EXpress 1-3571.

PLP GUY-GRIPS ARE ALSO AVAILABLE IN COPPER-WELD, BRONZE, AND STAINLESS STEEL.

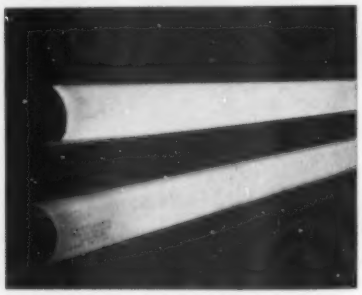
*Based on current strand prices—75,000 feet to carload lots.

PLP GUY-GRIPS DON'T SLIP . . . even under impact!

Made in accordance with or for use under one or more of the following U.S. Patents 2,271,019; 2,587,521; 2,605,533; 2,801,845; other patents pending.

PREFORMED LINE PRODUCTS CO.
6840 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

lamp is relatively unaffected by deposits of light-stealing dust and dirt on the top surface of the lamp. This will result in significant reduction in lamp cleaning and maintenance costs, according to Mr. Pleasants. The new lamp may be mounted bare without external reflectors, even in installations where the ceiling provides very poor reflectance. Also, in installations such as show cases and concealed lighting applications where space limitations make a reflector impractical, the new lamp is particularly useful.



A new type directional fluorescent lamp with internal reflector resulting in 70 per cent more downward light is shown at top. Beneath it is a regular type lamp.

The new Sylvania directional fluorescent lamp has an internal reflector coating, covering more than half of the lamp's circumference. This provides for a light aperture of less than half of the lamp. Initially, the lamps are available in the four- and eight-foot single-pin types. They will be available in other sizes at a later date.

Brief news notes of manufacturers

KEEPING PACE with the continued growth of its line, Eagle Electric Mfg. Co., Inc., Long Island City, N. Y., announces the acquisition of its fourth plant.

This building, which takes up a square city block, is located in Astoria, N. Y., and will give Eagle additional manufacturing and warehousing space of 125,000 square feet, for a total of over 400,000 square feet.

Eagle has also bought out all the physical assets of the Capitol Wire & Cable Co. This equipment has been moved to the newly acquired building and will be put into operation within the next few months, which will further the scope of Eagle as a basic manufacturer of the various components used in the manufacture of its products.

FEDERAL PACIFIC Electric Company, manufacturer of small air circuit breakers and other types of electrical equipment, has occupied its new Dallas factory and warehouse at 901 Regal Row in Brook Hollow Industrial District.

In the 46,000-square-foot masonry building, the company makes electric panelboards, motor-control centers, unit substations, metal enclosed switchboards, certain types of bus duct, wiring troughs, oil field pump controls, and other items.

The building includes offices of plant manager D. H. Ladd and the district sales force, headed by W. L. Sullivan.

* * *

CONSTRUCTION of a new $250,000 plant at Berkeley, Calif., has been announced by the Prescolite Manufacturing Corp., producers of commercial and residential lighting fixtures. The plant, which will provide an additional 45,000 sq. ft. of production and storage area, will be located adjacent to the company's main plant in Berkeley.

Expansion of the Prescolite plant at Neshaminy, Pa., has also been started, according to the announcement. The move will double the size of the plant to provide for additional production and warehousing space. Total plant area at Berkeley and Neshaminy will be increased to approximately 263,000 sq. ft. as a result of the expansion program.

* * *

THE OKONITE Company, 78-year-old New Jersey firm, has announced purchase of the 160-acre Studebaker-Packard plant at New Brunswick in an expansion move.

Okonite will start occupying the plant within three months and will eventually employ more than 1000 there, according to the announcement made jointly by board chairman Albert F. Metz and President R. Stuart Keefer.

The most modern equipment will be installed at New Brunswick in order to expand the company's facilities for producing its major line of high quality cables for which there has been a steadily increasing demand. The operations at the new plant will be confined to manufacturing functions.

"It's a genuine Roger Babson!"

GENERAL MANAGER of Viking Air Products, Marion I. Levy, has announced company plans to establish a manufacturing branch for blower wheels and assemblies in the Southwest.

Several sites are under consideration for 60,000 square feet of manufacturing plant-space to serve growing airconditioning, evaporative cooler, and cooling tower markets in the Texas-Oklahoma-Kansas area.

Dates Ahead

International Association of Electrical Inspectors, North Carolina Chapter, Annual Meeting, Carolina Hotel, Raleigh, N. C., April 10-11, 1956.

Southeastern Electric Exchange, Engineering and Operation Section, Bon Air Hotel, Augusta, Ga., April 12-13, 1956.

International Association of Electrical Inspectors, South Carolina Chapter, Annual Meeting, Columbia Hotel, Columbia, S. C., April 16-17, 1956.

International Association of Electrical Inspectors, Alabama Chapter, Annual Meeting, Whitley Hotel, Montgomery, Ala., April 19-20, 1956.

International Association of Electrical Inspectors, Georgia Chapter, Annual Meeting, Ware Hotel, Waycross, Ga., April 23-24, 1956.

Ninth Annual Conference for Protective Relay Engineers, A & M College of Texas, College Station, Texas, April 23-25, 1956.

Petroleum Industry Electrical Association and **Petroleum Electric Supply Association,** 28th Annual Joint Conference, Statler Hilton Hotel, Dallas, Tex., May 1-3, 1956.

International Association of Electrical Inspectors, Joint Four Chapters — George Welman, North Louisiana - East Texas, Texas, & Texas Gulf Coast — Annual Meeting, Alexandria, La., May 4-5, 1956.

National Electrical Contractors Assn., Third District Convention, Fort Sumter Hotel, Charleston, S. C., May 10-12, 1956.

National Industrial Service Association, Inc., Bellevue Stratford Hotel, Philadelphia, Pa., May 13-17, 1956.

Edison Electric Institute, 24th Annual Convention, Atlantic City, N. J., June 4-7, 1956.

National Association of Electrical Distributors, 48th Annual Convention, Ambassador-Chelsea Hotels, Atlantic City, N. J., June 10-16, 1956.

Public Utilities Accident Prevention Conference, Hotel Roanoke, Roanoke, Va., June 22, 1956.

Virginia Chapter, IAEI, Annual Meeting, Hotel Roanoke, Roanoke, Va., June 25-26, 1956.

American Institute of Electrical Engineers, Summer and Pacific General Meeting, San Francisco, Calif., June 25-29, 1956.

Public Utilities Assn. of the Virginias, 38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15, 1956.

Maryland Utilities Assn., 32nd Fall Conference, Cavalier Hotel, Virginia Beach, Va., Sept. 14-15, 1956.

National Electrical Contractors Assn., Annual Convention and 2nd National Exposition, Sheraton - Palace Hotel, San Francisco, Calif., Sept. 23-29, 1956.

American Institute of Electrical Engineers, Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5, 1956.

Southeastern Electric Exchange, Sales Section Annual Conference, Tides Hotel, St. Petersburg, Fla., Oct. 3-5, 1956.

Southeastern Electric Exchange, Accounting Section Conference, Miami Beach, Fla., Oct. 11-12, 1956.

International Association of Electrical Inspectors, Southern Section, Annual Meeting, Statler Hilton Hotel, Dallas, Tex., October 22-24, 1956.

Five Key Men Describe Unusual Flexibility, Compactness, Economy of G-E Distribution System

In their own words, Architect, Consulting Engineers, Contractors tell how they benefit, along with tenants and owners, in new Indianapolis bank building

"Simplicity and flexibility were the keynotes around which the entire building was planned," according to Emmett G. Fowler, partner, and E. C. Vollrath (kneeling), chief electrical engineer, of Bevington, Taggart and Fowler, consulting engineers in Indianapolis since 1925. "We selected the General Electric system—switchboards, motor control centers, feeder busways, and panelboards—because it's the least complicated and most flexible—and its quality is unquestionable!" Architect and contractor agree, and they speak for themselves on the next page. Pictured with Mr. Vollrath are G. M. Wadleigh, vice president, and William R. Dabbs, engineer, of Sanborn Electric Company, electrical contractors in Indianapolis, as they inspect the General Electric Type DA7093 motor control center.

The imposing, new Indiana National Bank Building, rising 14 floors above East Market Street in Indianapolis, is equipped with G-E "system-engineered" distribution equipment from basement to penthouse. Architects, D. A. Bohlen and Son • Consulting Engineer, Bevington, Taggart and Fowler • Electrical Contractor, The Sanborn Electric Company • Electrical Distributor, General Electric Supply Co., Indianapolis.

"Compact?" continues Mr. Vollrath, "General Electric's design of the main switchboard and motor control center line-up permitted us an almost 50% space-saving factor. The unique back-to-back placement enabled us to utilize both sides of this power equipment in a little more than half the space normally required. By the way, we were delighted with the excellent service from G. E. The General Electric equipment was actually delivered prior to our own deadline."

"General Electric engineers gave us built-in flexibility," says Mr. Dabbs, "when they took the specifications and came up with a motor control system that meets the needs of this modern building *precisely*. Optimum circuit control makes it possible to change over to larger motors in a matter of minutes." G. E.'s efficient "one source of supply" also impressed Mr. Dabbs. "We were pleased," he said, "with G. E.'s all-out cooperation, including their rapid-fire delivery."

"A unique installation from start to finish," says Mr. Wadleigh, who has been responsible for many important projects in the Midwest, as he inspects the General Electric busway. "Ease of operation and maintenance were considered essential. In one compact package, G. E. not only met all the immediate power needs of the building but gave us the advanced flexibility we'll need for years to come."

"Yes, maximum flexibility," says Robert C. Bohlen of D. A. Bohlen and Son, architects. "With our G-E system we can provide power to any piece of tenant equipment. If new tenants come in, rearrangement of office space can be accomplished easily. Our confidence in General Electric has been further solidified by the all-out cooperation that was so apparent throughout this project."

Add them up! *"Ease of operation and ease of maintenance—one compact package,"* says the contractor . . . *"Simplicity and flexibility,"* says the consulting engineer . . . *"All-out cooperation throughout the project,"* says the architect. These words *could* be your words. Let General Electric work with *you* on your next project! A phone call to your nearest G-E representative is all the invitation we need.

G-E System-Engineered Equipment Offers These "7 Basic Advantages"

The General Electric Secondary Distribution System can include motor control centers, switchboards, busway, unit substations and panelboards. This "system-engineered" equipment offers seven **work-together advantages** • **True extendability** because G-E standardized components are especially designed for easy addition or relocation • **Easy-to-assemble** • **No loss when moving** • Practically 100% re-use of materials • **Complete relocation of loads** without rewiring • **Maximum electrical efficiency** from components designed to work together • **One source of supply** for all components • **Skilled planning service** from the G-E Engineer who is selling not just components but "system-engineered" equipment with a built-in future. Send for **Motor Control Center Bulletin** (GEA-6367) to Distribution Assemblies Department, Plainville, Conn.

Progress Is Our Most Important Product

GENERAL ELECTRIC

News about people

W. J. (Gill) Googe has been appointed to the position of chief system planning engineer and **Johnny Boyd** has been named to Mr. Googe's former post as supervisor of transmission for **Southwestern Gas and Electric Company,** Shreveport, La. Announcement of these promotions was made by President J. Robert Welsh.

Mr. Googe will have the responsibility of determining needs, plans and justification for location of generating units, transmission lines and related sub-stations, and large distribution system improvements. He

W. J. "Gill" Googe

will also be in charge of planning improvements and additions to the present transmission system, the design of transmission relaying and supervision of distribution relaying in the divisions.

Mr. Googe has been with Southwestern since 1928. He was named supervisor of transmission in 1945, the post he held until named to the newly created position.

Mr. Boyd has been serving as assistant supervisor of transmission since 1952. In his new post, he will

Johnny Boyd

be in charge of operations and maintenance of the company's transmission system. He will also have supervision of the system electricians. Mr. Boyd has been with Southwestern since 1940.

Appointment of **George S. Siegrist** as vice-president of the **Abolite Lighting Division** of The Jones Metal Products Company, West Lafayette, Ohio, has been announced by the company. Abolite, one of the original members of the RLM Standards Institute, manufactures a complete line of industrial lighting fixtures for mercury and incandescent lamps.

For the past two years Mr. Siegrist has been sales manager of the Abolite Lighting Division, and prior to joining the company, in February, 1952, was associated with United Air Lines, Chicago, and the Warner and Swasey Company, Cleveland, Ohio.

George R. Hill has been appointed to the newly created position of advertising and sales promotion manager of **Trade-Wind Motorfans, Inc.,** Rivera, Calif., manufacturers of home ventilating equipment. Announcement of the promotion was made by **George F. Sleight,** newly-appointed general sales manager.

Mr. Hill has been associated with Trade-Wind for the past four years in the capacity of assistant sales manager. Mr. Sleight, who has served as sales and advertising manager, has been named to the new post of general sales manager.

Lawrence H. Hirschbach has been appointed manager of marketing for **General Electric** home heating and cooling, according to F. J. VanPoppelen, general manager of the department. Mr. Hirschbach was formerly manager of builder and modernization sales.

In the heating industry since 1933, Mr. Hirschbach has served with the Fitzgibbons Boiler Company of New York as sales representative, with Gibbs and Hill, New York consulting engineers, and from 1950 to 1953 as an officer of Controlaire, Inc., G-E heating and cooling distributor of Fort Lee, N. J. He had served with General Electric from 1947 to 1949 and returned to G-E as manager of HHC builder sales in 1953.

He is the author of a number of papers on heating and air conditioning. His most recent effort has been to develop a realistic standard for air conditioning ratings within the industry.

Three promotions in **Duke Power Company's** Charlotte general office were announced recently by company officials.

Named manager of the Industrial Power Department was **Channing B. Brown,** and **E. R. Davis** was promoted to assistant manager of the same department.

Appointed to the newly-created position of supervisor of stores was **M. A. Edwards,** who will direct system stores operations and have charge of the company's central warehouse now under construction on the outskirts of Charlotte.

James Baxter has been elected vice-president of **Cornish Wire Company,** New York City. Associated with Cornish since 1949, Mr. Baxter

James Baxter

will continue in the capacity of sales manager.

Cornish is a leading producer of electronic and electrical wires and cables, operating a wire harness assembly factory at Rutland, Vermont, in addition to its modern plants at Williamstown and North Adams, Mass.

G. Fred Cook, Jr. has been appointed director of public relations for the **Virginia Electric and Power**

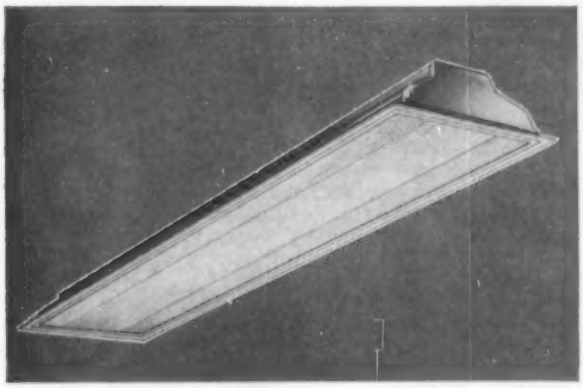
G. Fred Cook, Jr.

Lighting by DAY-BRITE Lighting Fixtures makes the big difference...

Announcing a new line of integrated recessed

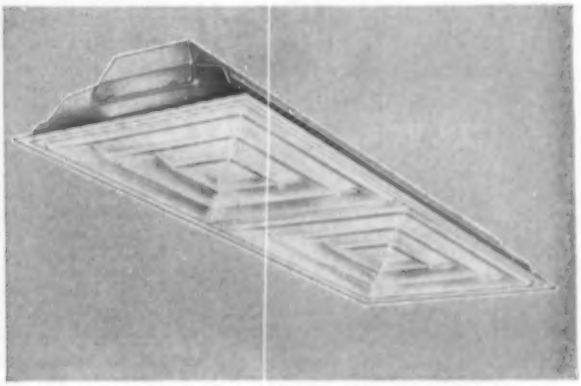
lighting compatible with all 63 ceiling systems

including—acoustical ceilings using exposed runner, exposed panel, exposed grid, concealed mechanical, metal "Tee-Bar" suspension... also conventional plaster ceilings.



New, shallower 12-in. wide Troffers, available with plastic Clear-tex, egg-crate louver or low-brightness Controlens® enclosures.

®Holophane Co., Inc.



24-in. wide MOBILEX®, available with translucent plastic, egg-crate louver or glass enclosures.

Get details of new economies

Your Day-Brite representative has full details of the economies of Day-Brite's new line of integrated recessed lighting. Call him—you'll find this information valuable.

Certified Lighting for a Better America

61136

"DECIDEDLY BETTER" DAY-BRITE Lighting Fixtures

Day-Brite Lighting, Inc.
5435 Bulwer Ave.
St. Louis 7, Missouri

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

Company. Mr. Cook was formerly Portsmouth area manager.

He succeeds **A. H. Herrmann** who is eligible for retirement but will remain as a consultant in the department. Mr. Herrmann has been with Vepco for 46 years.

Replacing Mr. Cook at Portsmouth will be **P. W. Smith,** while **W. R. Black** will take Mr. Smith's former post as director of agricultural sales.

Mr. Cook, with Vepco for 28 years, has served the company in Richmond, Fredericksburg, Suffolk, Portsmouth, and Virginia Beach.

William Deans

G. E. Heberlein

L. A. Lipscomb

President W. M. Scott, Jr., has announced the election of the following officers of the **I-T-E Circuit Breaker Company.**

William Deans, former vice-president in charge of engineering, was named vice-president. Mr. Deans joined I-T-E as chief engineer in 1933, and prior to that, served both as chief engineer and general manager of Sundh Electric Company. He is a director of The Chase-Shawmut Co., a subsidiary of the I-T-E Circuit Breaker Co.

Mr. Deans is well known in engineering circles. After graduation from Cornell in 1913, he served on the factulty there and later on Thomas A. Edison's personal staff. He is a member of NEMA; a Fellow of AIEE, and a member of several honorary engineering societies.

G. E. Heberlein, manager of the company's Switchgear Division since 1950, succeeds William Deans as vice-president in charge of engineering. In 1941, Mr. Heberlein joined the Railway and Industrial Engineering Company, now the R&IE Equipment Division of I-T-E in Greensburg, Pa., where he served first as assistant chief engineer and later as chief engineer.

L. H. Lipscomb was named vice-president in charge of sales. In 1937, Mr. Lipscomb joined the BullDog Electric Products Company of Detroit, now a subsidiary company of I-T-E. While there he served successively as field engineer, district office salesman and manager, regional manager, and general sales manager.

The appointment of **Russell A. Schlegel** as manager of industrial product sales has just been announced by **Wilbert H. Steinkamp,** vice-president in charge of sales of the **Weston Electrical Instrument Corp.,** Newark, N. J., a subsidiary of Daystrom, Inc. He will assume complete responsibility for the sale of Weston industrial instruments in domestic markets.

Mr. Schlegel has had nineteen years of experience in the instrument field, handling the sale and application of industrial instruments and components for a large manufacturer. Immediately prior to joining Weston, he was responsible nationally for sales to the chemical and petroleum industries.

R. W. Kelly has been assigned to field engineering work in **Line Material Company's** sales organization in Alabama. Mr. Kelly will have his headquarters in the company's Birmingham office. He replaces C. W. Ashby who resigned recently. He has been with L-M since receiving his BSEE degree from Purdue in 1949. He served initially as a test engineer, and more recently he has been a sales application engineer.

Frederick K. Bullard has been appointed district sales manager of **National Electric Products Corporation's** Florida sales district, it was announced by the Pittsburgh firm's vice-president, R. C. Bennett, Jr.

Mr. Bullard, a graduate of Harvard University, has been with National Electric since 1951 when he joined the company's Service Department and completed the firm's Sales Training Course. His new position places him in National's Southeast Sales Region managed by W. J. Barnes.

Frederick K. Bullard

George W. Hendrix and **R. B. Hamilton,** sales engineers, have been appointed by **The Peerless Electric Company,** Warren, Ohio, as Southern representatives for The Peerless Fan and Blower Division.

Mr. Hendrix was formerly associated with Chelsea Fan and Blower Company, Atlanta, as a sales engineer before joining Peerless. He received his Bachelor of Electrical Engineering Degree from Georgia Institute of Technology.

George W. Hendrix

Mr. Hamilton attended the University of Alabama and is known for his work on air handling and heat transfer equipment.

R. B. Hamilton

Mr. Hendrix bases his operations in Atlanta and Mr. Hamilton works out of Hickory, N. C.

KEEP YOUR CONDUIT JOBS ON SCHEDULE . . .
WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER
Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.
Call your Youngstown distributor

Youngstown

BUCKEYE QUALITY YOUNGSTOWN SERVICE CONDUIT

●You can keep your jobs on schedule, avoid lost time and unnecessary overhead by relying upon your Youngstown Distributor for Youngstown Buckeye rigid steel conduit. You'll get the size and quantity of good steel conduit you want when you want it. Phone your Youngstown Distributor. He'll take care of your order promptly.

THE YOUNGSTOWN SHEET AND TUBE COMPANY Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Merle P. Spurrell has been promoted to general sales manager of **BullDog Electric Products Co.**, Detroit, Mich., to succeed **Leo H. Lipscomb** who has been elected vice-president in charge of sales, I-T-E Circuit Breaker Co., Philadelphia, BullDog's parent company. The announcement was made by A. A. Togesen, vice-president in charge of marketing for BullDog.

Mr. Spurrell attended the electrical engineering school of Michigan State University, and joined BullDog in

Merle P. Spurrell

1940 as a field engineer. In 1942 he became Detroit District sales manager. He later was appointed Wolverine Division sales manager (now known as Northern Region). In 1950, Spurrell was transferred to Chicago as Midwest Regional sales manager for BullDog.

The Moloney Electric Company, of St. Louis, Missouri, recently announced the appointment of **Carl O. L. Hoffsten** as manager of advertising and publications, replacing **R.**

Carl O. L. Hoffsten

W. Baumann who left the company to become a manufacturer's agent.

Mr. Hoffsten's background includes more than twenty years in newspaper and industrial advertising and public relations. He was formerly with the Wagner Electric Corp., St. Louis, Mo.

The appointment of **Howard N. Morse** as district sales manager for **The O. A. Sutton Corporation** has been announced by Fred Kaths, sales manager of the Consumer Appliance Division of the company. In his new position, Mr. Morse will be responsible for sales of Vornado air conditioners and air circulators in the states of Georgia, Florida and eastern Tennessee.

Mr. Morse was formerly district manager for Hallicrafter. Before joining that organization, he was division manager for Zenith Radio Corporation for six years.

V. A. Elmblad, Southwestern district manager of the **Graybar Electric Company** announces that effective immediately **R. L. Heinz** has been appointed operating manager of Graybar-Shreveport.

Mr. Heinz came with Graybar in November, 1948 in Kansas City in the capacity of office salesman, progressing in February, 1951 to district supervisor of training. In March, 1952 he transferred to Oklahoma City in the capacity of operating manager, the position he held until his recent appointment.

Operating and engineering vice-president **H. B. Robinson**, of **Carolina Power and Light Company**, has been assigned additional duties, according to **Louis Sutton**, president of the power firm.

Mr. Robinson, who was also recently made general manager of the company, will have the responsibility of the district operations department, the personnel department, and the right of way department, in addition to his engineering work.

Technical books

for the electrical man

Construction Planning, Equipment and Methods

By R. L. Peurifoy. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., 534 pages, $8.50

This clearly-presented, practical application of engineering principles to construction problems, another in the McGraw-Hill series in civil engineering, applies the fundamentals of engineering, as a science, to the field of construction. Emphasis is given to the importance of selecting equipment based on satisfactory performance under varying conditions, and to the savings produced by one type of equipment as compared to others. A complete development of job planning, job layout, and record keeping is included.

The four-fold purpose of the book is to provide material concerning construction for students in engineering, architecture, and related fields; to supply professional men in the construction industry with a guide in planning construction projects, selecting the most suitable construction equipment and methods for each project; to furnish engineers and architects with a guide in designing projects and writing specifications so that the most satisfactory and economical construction methods are used; and to provide a basis for analyzing the performance, cost, and suitability of various types of construction equipment. This information will be of considerable value to manufacturers, distributors, and users of construction equipment.

Other topics covered in the book include design of belt conveyor systems, a discussion of methods for reducing cost of forms for concrete structures, with illustrative examples, and safety engineering as it applies to construction.

The author, R. L. Peurifoy, is professor of construction engineering, Texas A&M.

Record Changer Manual, Volume 7

Published by Howard W. Sams and Co., Inc., 2201 E. 46th St., Indianapolis 5, Ind., 288 pages, $3.00

Volume No. 7 of the paper-bound Changer Service Manual series contains complete service data of seven record changers and 12 tape recorders produced during 1954 and 1955. For record changers, complete descriptions of the change cycles and suggested remedies for correcting any malfunctions are presented. Schematics, parts lists, replacement parts data, and trouble shooting procedures are presented for tape recorders.

A cumulative index showing model coverage in all volumes is included in order to enable quick reference to applicable service data. A cross-reference that shows which basic changer mechanism was used in a particular receiver is also included.

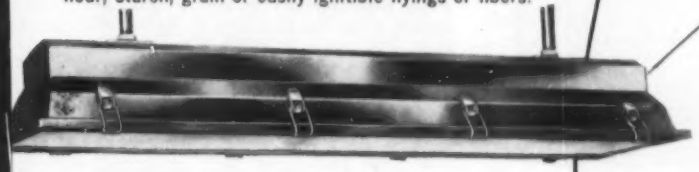
remember these 3

specialized Wheeler fixtures for hazardous • non-hazardous locations

DUST-TIGHT

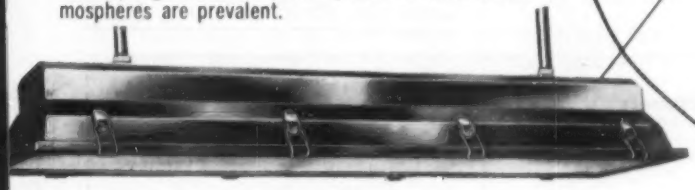
For Class II — Groups F & G, & Class III Requirements

For atmospheres containing carbon black, coal, coke, flour, starch, grain or easily ignitible flyings or fibers.



VAPOR-TIGHT

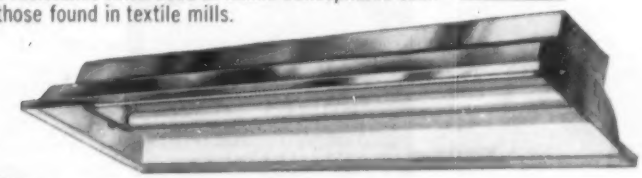
Designed for use in locations where extreme dirt conditions, high moisture content, acid or alkaline atmospheres are prevalent.



TEXTILUME

WHEELER RLM

Specifically designed for maximum corrosion resistance when used in humid atmospheres such as those found in textile mills.



BRAND NEW!

For the first time, 2-LAMP, 90 WATT UNITS in Dust-Tight, Vapor-Tight and Textilume lines!

Write for

BULLETIN #98

ask your lighting supplier about

Wheeler

WHEELER REFLECTOR COMPANY • 275 Congress St., Boston 10, Mass.

Distributed Exclusively through Electrical Wholesalers

Free bulletins

available to our readers

An **engineering manual** on Uptegraff **distribution transformers** has just been published. These standard station-type, liquid-filled transformers range from 150 kva to 500 kva. Featured is a series of extensive charts showing performance data and dimensions and weights for single and three phase transformers, both oil- or Askarel-filled. Also included are useful data on terminal details, dimensions and arrangements, testing and inspection practices, standard accessories and information on ordering. Copies of the new manual, Bulletin 136, may be obtained from **R. E. Uptegraff Manufacturing Co.,** Scottdale, Pa.

A new electric **power busway** having reactance values eight to 23 times those of conventional feeder busways is described in a new eight-page, two-color bulletin (GEA-6469) issued by Advertising and Sales Promotion, Distribution Assemblies Department, **General Electric Company,** Plainville, Conn.

The high-reactance busway, known as the Type CL, is designed for use in commercial and industrial buildings for connection between service entrance and main switchboard or wherever it is desired to reduce available short-circuit current value to 100,000 amperes RMS or below. It is available in 1000 to 4000 ampere ratings, 3-phase, or 3-phase, 4-wire construction.

The new publication describes in detail the construction and application of this G-E high-reactance busway. It also lists ratings, weights, dimensions, installation data, and guide form specifications.

Light, An Aid To Sight, a new eight-page color folder for use by electric light and power companies in disseminating information on the application of **good lighting principles** in the home, has just bten released by **Better Light Better Sight Bureau.**

Pocket-sized and attractively printed, the new folder was designed for distribution to optometrists and ophthmalogists, for use at meetings of service club and civic groups, and for availability to schools.

The folder (form B-562) may be obtained from Better Light Better Sight Bureau, 420 Lexington Ave., New York 17, N. Y., at $2.00 per hundred, or $1.50 per hundred for quantities of 1,000 and over.

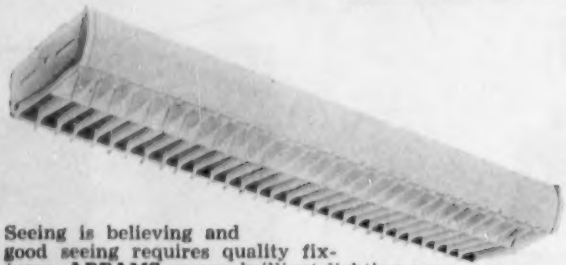
A 23-page color brochure describing and illustrating the history, recognition, safety, permanence, and expansion facilities of **rigid steel conduit** and **electrical metallic tubing** has been released by the **National Electrical Manufacturers Association,** 155 East 44th St., New York, N. Y.

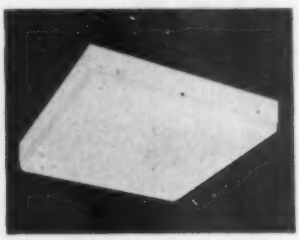
Also available without cost from NEMA is a 132-page manual entitled **Steel Electrical Raceways,** which discusses fully the function of steel conduit, the place of conduit in outside and inside wiring, contains a reference guide to National Electrical Code requirements as they effect steel conduit, has 12 pages of useful data tables with examples of their use, and contains 62-pages presenting the "how-to" of conduit installation.

This manual is published by the American Iron & Steel Institute. The latest edition will be forwarded free by NEMA, if requested on your organization letterhead.

Abrams **"IN STOCK SERVICE"**

---THE ANSWER TO ALL YOUR LIGHTING PROBLEMS!





Seeing is believing and good seeing requires quality fixtures. **ABRAMS** means brilliant lighting performance at believably competitive prices, with speed **"In Stock Service"** throughout the South.

- **Large Stocks**
- **Immediate Shipments**
- **Easy to Pick-up**
- **Competitively Priced**

Manufactured by

ABRAMS LIGHTING

3432-34 Market Street Philadelphia 4, Pa.

WAREHOUSE STOCK
GA., ALA., TENN.
Griffin & Griffin
10 Peachtree Place, N. E.
Atlanta, Ga.

FLORIDA
Graham P. Dowling
P. O. Box 630
Tampa, Fla.

VIRGINIA
Robt. B. Helfrich
208 Cardinal Rd.
Birdneck Point
Virginia Beach, Va.

WAREHOUSE STOCK
N. & S. CAROLINA
Clyde E. Mims & Assoc.
3401 Spencer St.
Charlotte, N. C.

WAREHOUSE STOCK
SOU. OHIO, KENTUCKY, WESTERN INDIANA
Arthur L. Ehlers Co.
1031 Meta Drive
Cincinnati, Ohio

The complete line of REX **air conditioning blowers** for 1956 is shown in a new 18-page catalog just issued by **Air Controls, Inc.,** 2310 Superior Avenue, Cleveland 14, Ohio. Seventeen standard belt-driven models are listed, each available for either top or bottom horizontal discharge, and up or down discharge. The "UNI-PAK" universal models may be used to obtain any one of four discharge angles by means of a specially designed adjustable base. It is made in six sizes. Five sizes of Rex direct drive blowers are shown. These new models eliminate the necessity for belts, shaft bearings, and pulleys.

Their new **catalog** showing the **1956 line** of **Berns Air King fans** is now being supplied to wholesalers and dealers. The catalog includes a new line of economical window fans with and without push buttons, and the addition of push buttons to a number of other models. Included in the catalog along with window ventilating fans are: mobile fans, all purpose fans, floor circulators, dehumidifiers, pedestal air circulators, heaters, attic fans, commercial exhaust fans, louvers and shutters.

Requests for the catalog should go to **Berns Manufacturing Corp.,** 3050 N. Rockwell St., Chicago 18, Ill.

The Pyle-National Co. announces the availability of a new 6-page pamphlet describing their watertight line of high-lustre finished **sealing grips** for portable cords and cables used with all types of electrical equipment. This new bulletin describes in detail the wide variety of conduit and cable sizes in five body types.

A new 20-page, two-color illustrated catalog (Bulletin 7827) describing the new central station type sprayed coil **dehumidifiers** is now available from **American Blower Corp.,** Detroit 32, Mich.

The new catalog features a special 10-page section of application data, discussing pertinent factors relating to the selection and use of a sprayed coil dehumidifier. Water dilution, high humidification, evaporative cooling and selection for size are among the subjects discussed.

The new catalog also outlines the design and construction features of the sprayed coil units, emphasizing cooling coils, drain troughs, fresh water connections, spray nozzles, strainers and overflow trap.

The new 1956 **Dayton Fan Brochure** is now available. Designated SA-577, this eight-page, fully illustrated 8½x11" booklet containing listings on over 50 fans, may be obtained by writing **Dayton Electric Mfg. Co.,** 126 So. Oakley Blvd., Chicago 12, Illinois.

ONLY WINCO® Portable Electric Power

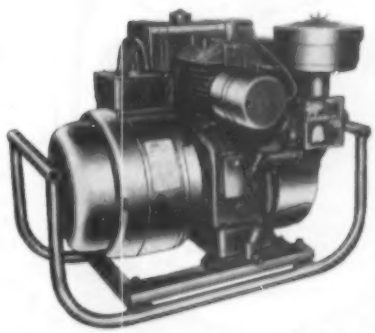
Gives You the Exclusive New CONSERV-er IDLING CONTROL

✓Extends Engine Life
✓Reduces Fuel Consumption
✓Lowers Maintenance Cost

Standard Equipment at No Extra Cost on Model Shown

Conserv-er Idling Control—A flick of the switch reduces engine to idling speed, easily, quickly and positively, when power is not needed. Conserves fuel, extends engine life—cuts service and operating costs.

205B1452D-1M2— New 2500 watt Direct Drive contractor model, 115 volts, 60 cycles, A.C. Control box with receptacles standard equipment.



Light weight
Only 158 pounds! Shock-mounted on convenient carrying cradle

Retractable Starter
Optional equipment at extra cost.

Super Power
King-size generator gives you close, steady, voltage regulation.

A complete line of Winco Engine Generators available for your individual power needs.

Easy to Start
4-cycle Briggs & Stratton engine gives you quick, easy, dependable starting.

Easy to Service
Engine parts & service stations readily available.

Easy to Use
Speedy-shift dolly for quick portability. Easily attached or removed. Optional at extra cost.

Wincharger Corporation
Sioux City, Iowa

Please send me full information about Winco Portable Electric Power with exclusive new CONSERV-er Idling Control.

NAME.....

ADDRESS.....

CITY.....

WINCHARGER CORPORATION
SIOUX CITY, IOWA
Wholly-owned Subsidiary of Zenith Radio Corporation

pryne
rhymes with FINE

ROOM
RATED
Blo-Fans
Easier to buy
Easier to specify
Ventilating
Fans

NOW! Pryne Blo-Fans are ROOM RATED — telling you instantly the size and model fan for best results under actual on-the-job conditions . . . *from simple square footage figures!*

And, only Pryne Blo-Fans are ROOM RATED to provide 4-minute cycle change of air under conditions actually encountered in the home.

- RR Calculators do the work for you! Translate CFM and cubic footage into the size and model fan needed for any room,— accurately, easily!

pryne
rhymes with FINE

FREE RR CALCULATOR!

PRYNE & CO., INC. ES84
KEYSER, WEST VIRGINIA

Rush the FREE Room-Rated Ventilating Calculator.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

New products

Overload-proof tester offered by Martindale

AN IMPROVED and more versatile Martindale V.A.O. Tester Model 455 now features a patented automatic overload protection system. Accidental overloads will not burn out the meter or the internal circuits, but will open the input circuit instead. It is then necessary only to press the

red reset button on the instrument face and proceed again with the instrument set for the proper function and range.

Meter sensitivity is 20,000 ohms per volt on all ranges, both a-c and d-c. Instrument housing is insulated, unbreakable, and resistant to shock and acids; and the large five-inch meter, covered with clear chip-proof lucite, is easy to read.

Test functions and ranges are both selected on a single rotary switch. Detailed instructions accompany the Tester, manufactured by Martindale Electric Co., 1361 Hird Ave., Cleveland 7, Ohio.

Double-duty door chimes highlight Rittenhouse line

TWO DISTINCTIVELY new model door chimes that double as dinner chimes highlight the 1956 line of door chimes from Rittenhouse Co., Inc., Honeoye Falls, N. Y.

Precedent, one of the featured models, is of modern design and functional simplicity. A harmonious eight-note signal welcomes the visitor. A decorative xylophone-type mallet permits chime to be used to summon guests for dinner or other household signaling purposes. Solid, brushed brass chime tubes are suspended from hand-burnished walnut block. Overall size is 9½ x 50 inches.

The Prelude model also sounds an eight-note entrance signal and can be used as a dinner signal. The sound bars have rich polished brass finish, with resonance tubes mounted on a contrasting base of natural walnut. Overall size is 11½ x 9 inches.

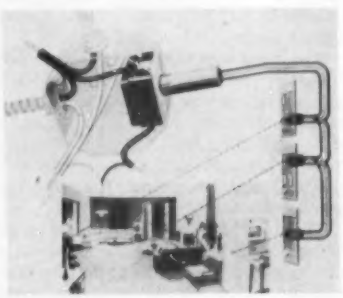
The Rittenhouse line contains 17 models and includes a chime for every type of home from under 1000 square feet to over 1500 square feet. For larger homes, up to six chimes can be operated together, at the same time, in perfect unison, all from one timer. Two new non-electric door chimes also are available.

An illustrated booklet, "How to Select the Right Door Chime for Your Home," contains complete information for the prospective home builder on advance preparation for wiring and location of chimes at various stations.

Remote control device has built-in transformer

PYRAMID Instrument Corporation, Lynbrook, Long Island, has introduced a new low-voltage remote control wiring device with a built-in transformer. The new unit called Remcon allows homeowners to control a single outlet or fixture from any number of switches conveniently placed throughout the house.

Remcon is simple to install, the manufacturer reports. All the contractor has to do is fit a Remcon unit into the outlet box and match the three wires of the unit to the three wires of the switch. Since only 6 volts are required to activate the outlet, #18 bell wire replaces the heavy BX cable normally run from outlet to switch and installation becomes sim-



ple and economical. He can just as easily install additional switches at desired locations and connect them in like fashion to the same Remcon unit.

Remcon requires no centrally located, external transformer and eliminates the need to wire each relay back to a central point. This makes each Remcon circuit an independent, self-contained unit, allowing installation at one outlet or at every outlet in

the house. Remcon has been found to be economically feasible, even for lower-priced homes.

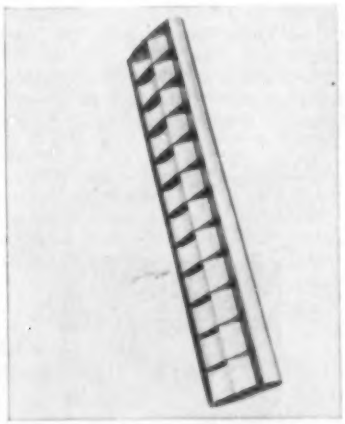
Because of its economy, simplicity and flexibility of installation, Remcon is ideally suited for the rapidly expanding home improvement and modernization market — particularly in the finishing of attics and carports and for additions being built onto existing homes. New bedrooms, playrooms, workrooms, dens, etc., are perfect locations for low voltage remote control and Remcon is expected to make many such installations economically possible for the first time.

Since #18 thermoplastic wire is used between the switch and the relay, "fishing" wire through walls becomes relatively easy. In fact, the ease of working with this new material is expected to make it practical to install more switches than ever before, even in homes already wired conventionally.

A complete catalog containing everything the contractor should know about Remcon switching, and which serves as a sales aid for explaining low-voltage remote control to prospects, is available by writing to: Pyramid Instrument Corporation, Lynbrook, Long Island.

Fluorescent luminaires for commercial use

A NEW LINE of fluorescent luminaires (Type XX) for suspension or surface mounting in offices and stores is available from the Westinghouse Electric Corp., Edgewater Park, Cleveland, Ohio. Providing direct-indirect light distribtuion when suspended and direct distribution when surface mounted, the luminaires are especially suited for modestly budgeted lighting programs.



The units come in four-foot lengths, and two-lamp and four-lamp types. Equipped with series rapid-start ballasts, the luminaires are shallow units with rounded metal side panels and louver shielding.

ONLY ELECTROMODE Offers so much! in Automatic ELECTRIC HEAT

ALL YOUR REQUIREMENTS FROM ONE RELIABLE SOURCE
COMPLETE OR SUPPLEMENTARY HEAT

FOR HOME . . . . . .

✓ BASEBOARD HEATERS
Low-Level Perimeter Heat

✓ WALL-TYPE AND PORTABLE
Fan-Circulating Models

✓ PANEL HEATERS
Radiant Convection

✓ RADIANT CABLE HEAT

WALL MODEL
For bathroom or small room.

FOR INDUSTRY . . . . . .

✓ SUSPENSION-TYPE
✓ PORTABLE AND SUSPENSION
✓ EXPLOSION-PROOF

SUSPENSION-TYPE
Solves hard-to-heat areas in the plant and isolated locations.

ONLY *ELECTROMODE* has the SAFETY-GRID

a completely sealed-in CAST ALUMINUM HEATING ELEMENT. All electric wires are insulated and embedded within this finned aluminum casting. Absolutely no exposed hot wires or glowing coils, and no danger of fire, shock or burn. It's the greatest feature any electric heater ever had and it is guaranteed for five years.

Around The FARM . . .

✓ MILK HOUSE HEATERS
✓ PUMP HOUSE HEATERS

MILK HOUSE HEATER
Also useful for brooder pens, fruit and vegetable bins, etc.

ELECTROMODE INSTALLATIONS BENEFIT CONTRACTOR AND USER

- Full Range of Designs and Sizes for every need.
- Automatic Room Temperature Control.
- Quality Line—Made by Experienced Manufacturer.
- No Call Backs—No Servicing—No Adjustments.
- Easy to Install—Saves Time and Labor.
- Profitable Line to Handle.

ELECTROMODE
Division Of
COMMERCIAL CONTROLS CORPORATION

Dept. ES-46, 45 Crouch St., Rochester 3, N. Y.

Please send FREE Electric Heating File, containing specifications, illustrations, installations, prices and how to figure electric space heating. We are interested in:

☐ Home and Office Heaters ☐ Industrial Unit Heaters ☐ Farm Heaters

Name _____

Address _____

City _____ Zone _____ State _____

The rigid steel louvers hinge down from either side for easy lamp changing and maintenance, and provide 30 degree crosswise and 25 degree endwise shielding.

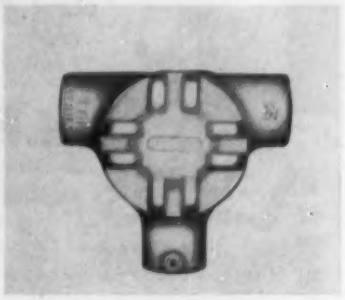
All metal surfaces are Bonderite treated and have a white baked-on enamel finish. Reflecting surfaces have a reflectance of 85 per cent or more. Hardware is cadmium-plated.

New fixture hangers are explosion-proof

THE Pyle-National Co., Chicago manufacturer of industrial electrical products, has developed a new threaded cover fixture hanger, "Pylets," for suspending explosion-proof or dust-tight pendent lighting fixtures.

The hangers are furnished with a set screw in the hub which locks the stem to prevent turning. The FO series of Pyle-National flexible fixture supports may be used in combination permitting the fixture to swing freely.

The "Pylets" are regularly furnished without mounting feet but can be supplied with a mounting strap when specified. Connection blocks, which are ordered separately, provide a convenient means for connecting line and fixture wires without splices in VTH series. The fixture may be completely assembled and wired on a bench ready for attaching to the hanger and connection block. The connection block is designed to fit the hanger without fastening screws. The fixture can be quickly



and easily removed for maintenance or replacement after disconnecting the wires at the terminal screws.

The units have a cadmium plated ferrous alloy body with aluminum alloy cover.

Expandable wall rack designed by Plan Hold

PLAN HOLD Division of Air Comfort Company, South Gate, Calif., manufacturers of the popular friction-type 'Plan Hold,' have developed and are now marketing a most unique wall rack.

Brackets pivoted within a wall plate support 'Plan Holds,' which are equipped with special "slide-over" clips. Brackets swing back and forth so reference is readily available to either side of plans. This construction allows for easy filing of skirted plans.

A rolling steel stand with built-in wall plate is also available, providing a more convenient support for the brackets and 'Plan Holds.'

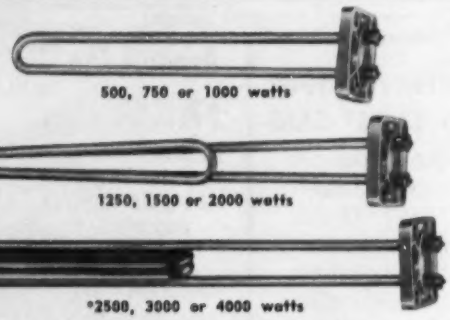
Pre-wired recessed unit delivers 78% efficiency

THE LIGHTING engineering team at Litecraft Manufacturing Corporation has designed a recessed incandescent downlight that is 78 per cent efficient. This is reported to be the most efficient optical train ever devised.

This efficiency rating has been conclusively established by Electrical Testing Laboratories' report No. 359205.

The test was made using an E 301-12 Litecraft prewired unit with 150 watt inside frosted lamp and Fresnel lens.

The record-breaking prewired unit is Underwriters' Laboratories Approved for use with lowest cost building wire. No asbestos wire is needed.



For Efficient, Reliable Water Heating

VULCAN *REPLACEMENT*

ELECTRIC IMMERSION ELEMENTS for DOMESTIC HOT WATER HEATERS Type DSF

MEET ALL REQUIREMENTS of Underwriters' Laboratories. Each unit complete with one composition gasket and individually boxed for shelf stock.

CONSERVATIVE watt density ratings for longer life.

EXTRA HEAVY FORGED BRASS FLANGE eliminates possibility of distortion and resultant leakage.

"POWER BOND" attachment of heater tubes to flange for leakage elimination.

"DIE STRUCK" bends in tubular heater added protection against grounds and shorts.

MOISTURE PROOF PROTECTION at terminal ends by high-heat resistant thermoplastic insulators.

118 OR 236 VOLTS

*236 VOLTS ONLY

ORDER THROUGH YOUR LOCAL JOBBER

VULCAN ELECTRIC CO., DANVERS 31, MASS.

Makers of Vulcan Electric Soldering Tools, Solder Pots, Glue Pots, Branding Irons, Heating Units and Heating Devices.

Eagle "Slo-Lag" fuses give overload protection

EAGLE "SLO-LAG" plug fuses, designed to absorb the temporary overload caused by the starting of motors, are now being marketed nationally by Eagle Electric Mfg. Co., Inc., Long Island City, N. Y.

The starting of motors in appliances and other equipment such as air conditioners, washing machines, dryers,

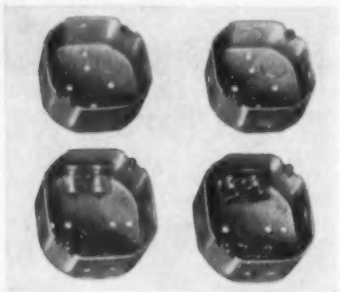
power tools, etc., produce an initial heavy surge of current which blows ordinary fuses. But Eagle "Slo-Lag" plug fuses are designed with a Thermal element which absorbs this tem-

porary overload and yet protects against dangerous overloads and short circuits.

These fuses are available in 15-20-25-30 amp sizes, made with a shock-proof-glass top, and are listed by Underwriters' Laboratories. "Slo-Lag" fuses are merchandised in an attractive, colorful, self-service dispenser which can be used for both display purposes and shelf packing.

Keystone outlet box features improved pri-outs and clamps

PRI-OUTS which can be quickly removed with one easy twist of a screwdriver, and "smooth ridge" clamps which assure positive gripping without danger of damaging the cable, have been incorporated into the de-



sign of a new four inch octagon outlet box now available through Keystone Manufacturing Co., Center Line, Mich.

The new box, made of heavy code gauge steel, is the standard drawn box 1½ inch deep. BX clamps are furnished for installation of armored cable and flexible non-metallic tubing, Romex clamps for non-metallic sheathed cable or non-metallic flexible tubing. Knockouts are ½ and ¾ inch for rigid metallic conduit, and the 21/32 inch pri-outs are properly located for side or bottom entry. In addition, ½ inch knockout boxes and boxes with either BX or Romex clamps are available in combination with shallow and deep offset bar hangers 19½ and 24 inches long.

New Gayston Model HC drum reversing switch

SEVERAL UNIQUE construction features have been engineered into the new Gayston Model HC drum reversing switch to assure durability and superior performance.

The Model HC, manufactured by Gayston Corp., Dayton, Ohio, has silver tipped contacts, berylium copper preloaded contact springs, and molded contact block and barrier. It features self-cleaning, butt wipe contact action which results in a minimum of wear. Contact separation is

IF IT RUSTS... IT'S NOT A

KILLARK

ELECTROLET

ALL KILLARK FITTINGS ARE

- Non-Rusting
- Non-Corroding
- Lightweight
- Smooth
- Durable

MADE OF LONG LASTING ALUMINUM ALLOY

CONTACT YOUR KILLARK WHOLESALER

Atlanta—69 Mills St., N. W.

Dallas—1903 Griffin St.

Baltimore—11 W. 25th St.

FREE

KILLARK CONDENSED CATALOG

Killark

KILLARK ST. LOUIS

ELECTRIC MANUFACTURING COMPANY

VANDEVENTER AND EASTON • ST. LOUIS 12, MISSOURI

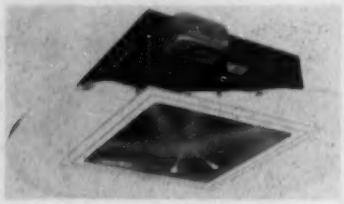
ENTRANCE FITTINGS • CONDUIT BODIES • FLUSH SWITCH FITTINGS
EXPLOSION PROOF FITTINGS • VAPOR TIGHT LIGHT FIXTURES
EXPLOSION PROOF LIGHT FIXTURES • SEALED BEAM FIXTURES

precise and positive. It can be used on either maintained or momentary contact, and quickly converted without tools.

Model HC has mounting holes designed to fit all standard brackets, and is suitable for surface or panel mounting (up to 3/16 inch panel thickness). It is rated for 1½ hp, maximum single phase and 2 hp-600 volts maximum polyphase operation.

New incandescent fixture announced by Neo-Ray

NEO-RAY PRODUCTS, INC., 315 East 22nd St., New York, N. Y., manufacturers of louvred ceilings, incandescent, fluorescent and slimline fixtures, announces the new incandes-



cent recessed mounted hinged 12 inch square "Lenslite." It may be used for individual, continuous, square or rectangular pattern mounting with no extra parts to buy. This new fixture is available with either a louvre bottom, flat lens, drop lens bowl, or drop alba bowl. They are supported with the famous Neo-Ray adjustable "Jack Clamps," pat. pend. These are furnished at no additional cost and hold the fixture firm and snug against the ceiling.

A specially designed unseen pivot hinged door cannot damage ceiling when swinging down. The fixture is equipped with Alzak bright reflector. The fixture has a heavy gauge steel housing in matte black finish with ample ventilation openings. The flange and door are in Neo-Lux baked white enamel finish. The outlet box is removable from the inside of fixture.

Flexibility of installation featured in new Walker line

A NEW LINE of fusible service entrance equipment is now being manufactured by Walker Electrical Company, 125 Bennett St., N.W., Atlanta, Ga.

The outstanding feature of this new line is its flexibility of installation. Eight back boxes and front covers fit dozens of combinations of factory assembled interior units. Back boxes, interiors, and front covers are packaged individually to enable the contractor to buy each item as needed on the job.

The panel boards are available in 100 ampere and 200 ampere carrying 8 to 32 plug fused circuits and 0 to 5-30 or 60 ampere 2 pole appliance pullouts. All wiring is "straight-in" and no looping is necessary. Both inside and rain-tight inclosures are now on the market.

Screw anchor kit offered by Holub

USERS OF screw anchors are promised savings up to 70 per cent with a new plastic anchor kit being introduced by Holub Industries, Inc., Sycamore, Ill.

Called the "Hi" 3-Star, the kit contains 100 No. 8 x ¾ inch plastic screw anchors, 100 sheet metal screws, and one 3/16 inch Hi-Twist carboloy tipped masonry drill—all packed in a handy transparent plastic box.

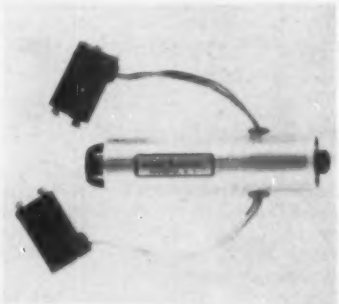
Big savings are possible because of the low unit cost, faster drilling with carboloy tipped drill, smaller hole required and simplicity of use. After drilling hole, the plastic anchor is simply inserted and the mounting is ready for the screw.

"Hi" plastic screw anchors are designed for outdoor and indoor use. Made of ethyl cellulose, an all-weather plastic material of unusual strength and durability, they are unaffected by moisture, heat, cold or age. They will not corrode, rot or otherwise deteriorate.

Tests conducted by the Pittsburgh Testing Laboratory prove their holding power to be equal to or greater than other types of anchors in all masonry materials.

New lighting tester by Electric Re-Light

A NEW lighting testing, Fluor-O-Tester, recently introduced by the Electric Re-Light Co., 625 Goodman St., Rochester 20, N. Y., eliminates



guesswork about the cause of flickering or burned-out fluorescent lights. The new instrument finds instantly whether the trouble is a faulty starter, defective ballast, or burned-out tube.

Latrobe PRODUCTS

FLOOR BOXES • WIRING SPECIALTIES

"Latrobe" Floor Boxes and Wiring Specialties are top performers because they are expertly designed of the finest materials.

"Latrobe" Products are proof that the shortest road to efficiency and economy lies through quality.

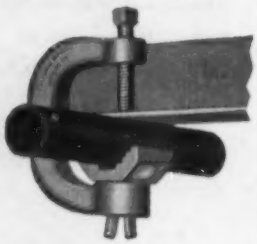
Adjustable Watertight Floor Boxes

All adjustable boxes are now equipped with a positive bond which makes them completely fire-proof.

Pipe or Conduit Hanger

The most economical and best pipe hanger sold today — rust-proof.

For hanging pipe ½" to 1½" thick to steel beams ⅜" thick.



Represented in the South by

CARY CHAPMAN & COMPANY
702 Whitehall St., S.W., Atlanta, Ga.
213 S. Front St., New Orleans 12, La.
1009 South Elm St., Greensboro, N. C.

F. P. WALTER COMPANY
4030 Chouteau Ave., St. Louis 10, Mo.

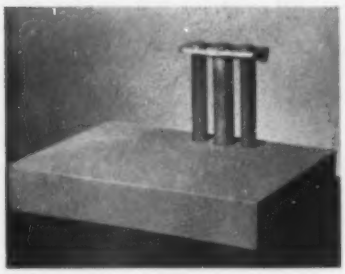
JIM ROBERTSON & COMPANY
2104 Irving Blvd., Dallas, Texas
1901 Commerce St., Houston, Texas

FULLMAN MANUFACTURING CO.
LATROBE . . . PENNSYLVANIA

New tool, RaceKlamp, cuts costs, saves time

A NEWLY developed tool that rigidly secures raceways for outlet boxes and panels without alignment has recently been introduced nationally to the electrical industry. Trade-named the RaceKlamp, this new tool cuts present costs in half by reducing time necessary for the electrician to assemble boxes on conduits.

Approved by the International Brotherhood of Electrical Workers



Union, RaceKlamp does not eliminate any qualified work now done by the electrician. It eliminates only unnecessary work, gets electrician off hot deck faster.

According to Frank H. Sparks, U. S. Sales representative with headquarters in Houston, RaceKlamp pays for itself in a single job by increasing work progress as much as 50 per cent and eliminating use of costly materials essential to the old method of stubbing-up conduits. This newly developed tool comes in ½ inch and ¾ inch sizes. Adaptors are available to convert ½ inch inserts to ¾ inch; and ¾ inch inserts to 1 inch permitting alignment of various sized conduits with one RaceKlamp.

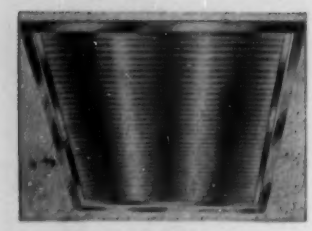
New industrial luminaires have ventilated reflectors

NEW GENERAL service ventilated reflectors for indoor industrial use with incandescent lamps are available from the Westinghouse Electric Corporation in two types, RLM standard dome and deep bowl. The new luminaires are also offered in two designs, the Locklite and Bayonet Heel.

In the Locklite design, the luminaires are of two-piece detachable construction and are designed to minimize installation and maintenance expense. The reflector and lamp are easily removed for servicing by turning 60 degrees counterclockwise. The reflector, made from highest grade porcelain-enameled steel, contains a standard keyless type socket with all metal parts protected from corrosion.

Also designed for ease of installation and maintenance, the two-piece construction of Bayonet Heel luminaires is separated by loosening three

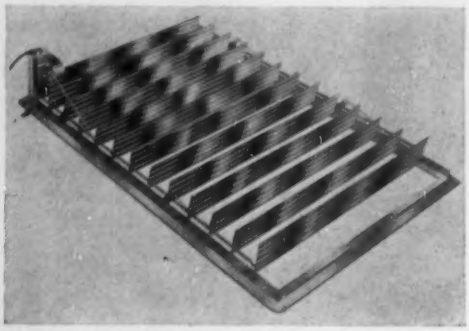
Inventory Control
Eliminate the many problems of inventory control by purchasing your Arro Anchoring and Drilling Devices as needed from your local industrial supplier, wholesale hardware, or electrical supply house.
Always Specify
TRADE ARRO MARK
COMPLETE LINE
ANCHORING AND DRILLING DEVICES
FOR ALL MASONRY
SPIRAL-DRIVE NAIL ANCHOR
MACHINE SCREW ANCHOR
LEAD SCREW ANCHOR
STUD BOLT ANCHOR
MAL-LEAD BOLT ANCHOR
LAG SCREW EXPANSION SHIELD
A-C-E EXPANSION SHIELD
O-E EXPANSION SHIELD
DOUBLE EXPANSION SHIELD
EXPANDER SETTING TOOL
TWO WING SPRING-TYPE TOGGLE BOLT
RIVETED HEAD TOGGLE BOLT
ARROFLUTE CARBIDE MASONRY DRILL
FOUR-POINT HAND STAR DRILL
TWIST DRILL POINT
FOUR-POINT DRILL POINT
RUBBERGRIP DRILL POINT HOLDER
LITTLE MAJOR TURNBUCKLE
TRADE ARRO MARK
See your industrial, hardware or electrical supplier
ARRO EXPANSION BOLT COMPANY
1520 Boone Ave., Marion, Ohio



AIR-FLO presents

the improved new...

AUTOMATIC
MODEL
610
AND
MODEL 610M
MOTORIZED



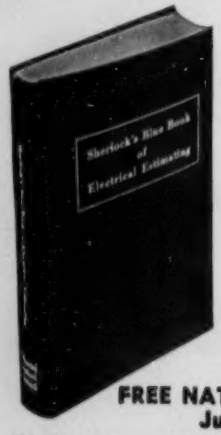
√√ check these features:

AUTOMATIC CEILING SHUTTER
Outstanding Features of Model 610 Automatic Ceiling Shutter

- Neutral Aluminum Color Blends With Any Decoration and Color Scheme
- Flush Appearance
- One Continuous Panel Regardless of Width
- Maximum Free Air Opening
- Fusible Links Release Spring Action in Case of Fire
- Full Opening Feature Minimizes Fan Air Delivery Loss
- Off White Finishes Available

Southeastern Factory Warehouse
177 Harris St., N. W., Atlanta, Ga.

MANUFACTURED BY AIR CONDITIONING PRODUCTS COMPANY
2340 W. LAFAYETTE · DETROIT, MICHIGAN



NEW 1956 EDITION
JUST OFF THE PRESS

ELECTRICAL
ESTIMATING GUIDE

Covers Over 2000 Wiring Jobs

This new, entirely different estimating guide has 175 completely worked out charts.

Authentic, Time Saving—Easy to Use

This book is easy to use—it has no complicated mathematics or formulas to work over. You merely determine the nature of the wiring, check it in the BLUE BOOK OF ELECTRICAL ESTIMATING and there's your answer—it's the simplest estimating book ever written.

FREE NATIONAL ELECTRICAL CODE BOOK
Just For Examining Blue Book

This book was written by a successful electrical contractor and estimating engineer with over 20 years' experience. It has an entirely different method of determining estimates on wiring jobs. Electrical contractors, journeymen, architects, and engineers will find use for this book every day. Gives time required to do jobs along with complete labor charges in every state in the country. Order this book now at special introductory price of $7.75. As a special offer to Electrical South readers the publishers give a free copy of the latest National Electrical Code Book just for examining the 1956 Blue Book of Electrical Estimating.

ESTIMATING HANDBOOKS ASSOCIATES — DE KALB, ILL.

Send me the NEW BLUE BOOK OF ELECTRICAL ESTIMATING and the latest edition of the National Electrical Code Book for 5 days free trial. I understand I may return the book within 5 days and owe nothing. If I keep it I will pay $7.75 plus postage for shipping. I keep the Code Book FREE even if I return the Blue Book of Electrical Estimating.

NAME

ADDRESS

TOWN ZONE STATE

☐ I enclose $7.75 to save shipping cost.
☐ Send C.O.D. I'll pay postman $7.75 plus C.O.D. fee on delivery.

April, 1956

screws and turning the reflector slightly. Corrosion protection is afforded by plating all metal parts. Luminaires may be top- or side-mounted with ½-inch or ¾-inch conduit or on 4-inch outlet box. The reflector is made of porcelain-enameled steel.

Wire stringing

(Continued from page 57)

gency braking on heavy earth-moving equipment. A small flexible steel cable leads from each pair of these brakes to a crank on the bed of the machine, giving complete control over braking of the bull wheels.

An interesting feature of design is the manner in which the reels of cable are supported. Two shafts with flanged rubber-tired wheels are adjustable so that the rim of any sized cable reel rides on these rubber tires. A brake on each shaft of the same type as that used on the bull wheels permits the degree of retardation necessary to keep the conductor under tension between the reel and the first bull wheel.

The braking system permits control over total tension in the conductors and relative tension between conductors. It is possible to dead-end and tie in directly without any sagging operation, thus effecting a considerable saving in time. Primary purpose of the tension stringing is to keep the conductors out of hot 4-kv primary and other circuits below.

The machine is also available with power-driven bull wheels so that wires may be pulled out under tension without damaging the conductors as well as strung in on reconductoring jobs.

Substation grounding

(Continued from page 55)

nected to the transformer tank and the secondary neutral and only one wire run from this common point to ground and if this single connection to ground became broken.

The rule was apparently intended for distribution transformers mounted on poles rather than substation transformers. I do not know of any cases where our substation grounds do not exceed the minimum requirements of the Code.

Grounding arresters

We do tie the arrester ground to the substation ground, but it is usually connected to the ground

mat through a separate wire of at least 2/0 copper. For example, when an arrester is mounted on a bracket attached to the transformer tank, one 2/0 copper wire is connected from the grounded side of the arrester to the station ground, and the transformer tank is connected to the station ground through a separate wire.

When arresters are mounted on a structure, a wire is run from the station ground up one leg of the structure, across the member on which the arresters are mounted and down the other leg of the structure and back to the station ground. The arrester grounds are connected to this loop of wire which is grounded at both ends. Any other equipment which may be mounted on this structure is connected to this same grounded loop.

Conductor Comparisons

(Continued from page 61)

throughout the calculations replace the value of ½ with ⅓ and proceed as before. To determine the relative conductor weights corresponding to the percentage values given in the last column of Table I, these values should be multiplied by 0.3333/0.5 = 0.6667. For example, group (1), line 2, we would have $75 \times 2/3 = 50\%$.

Thus, the expression given previously $(1.5 + 0.5 \times 0.388)/2.5 = 67.75\%$, would read $(1 + 0.3333 \times 0.388)/2.5 = 45.17\%$, from which $45.17/67.75 = 2/3$.

With this explanation, even those who are not familiar with problems of this nature should experience very little trouble.

A graphic chart is given to supplement Table I. With this chart, it is possible to compare weights of 4-wire three-phase lines with 2-wire or 3-wire single-phase lines for equal phase voltage and equal total power transmitted.

Code questions

(Continued from page 46)

the rope fall for any apparent bad sheaves or rotten or frayed rope.

24. (1) Try to get a dry and insulated platform or standing place from which to work. (2) Have sleeves rolled down and use gloves if necessary and at all practical. (3) Shield or cover exposed live parts if possible. (4) Always have a companion with you and if possible attach a dry, non-conducting

Why Take Chances Here?

BE SURE with

IDEAL Wire Nuts®

THE SOLDERLESS, TAPELESS WIRE CONNECTORS

(Patented, No. 1,933,555)

The cost of wire connectors is only a tiny part of the total cost of the job. Yet the whole system is literally held together by the connectors. They are as critical to it as the mainspring is to a watch. The best is always the cheapest.

IDEAL "Wire-Nut" Connectors have been setting quality and dependability records for over 30 years. Many of the original "Wire-Nut" Connectors are still in service . . . as good as the day they were installed!

FULLY APPROVED!

(UL) Contractor sizes 74B and 76B are fully approved as pressure cable connectors for general use in all types of branch circuit wiring, with all common wire combinations.

Sold through America's Leading Distributors

TRY THEM FREE!

IDEAL

IDEAL INDUSTRIES, INC.
1017 Park Avenue, Sycamore, Illinois

Please send FREE SAMPLES of IDEAL "WIRE-NUTS"

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Better installations in less time

Simple, quick to install

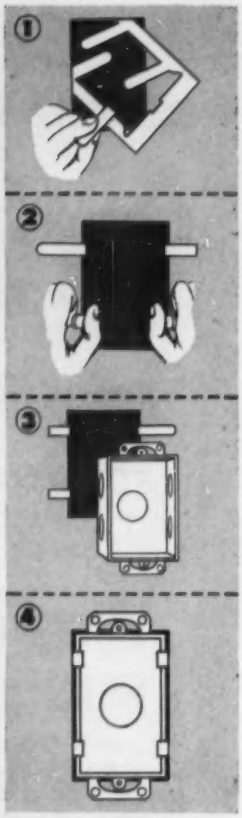
BLACKHAWK 540 BOX SUPPORT

stays rigidly in place

The Blackhawk No. 540 one piece box support slips into the wall opening and tabs are bent back to hold it in place. After the switch box is installed, the tabs are bent to the inside of the box squeezing it firmly in place. It's that simple and quick.

It makes a permanent installation because the Blackhawk 540 box support is a large single piece . . providing rigid, unified support. It does not wiggle or saw because it is parallel to the wall.

For simple, quick, permanent switch box installation, specify Blackhawk No. 540 box support. Ask your electrical distributor for Blackhawk.



Blackhawk Industries

BLACKHAWK INDUSTRIES

DUBUQUE, IOWA

• easily installed package
• adjustable capacity • non-overloading
• extremely quiet • high in efficiency
• duct mounted or free air delivery
• 1001 commercial ventilation uses
• "Q" Factor* assurance of satisfaction
. . . a few of the reasons why
"BUFFALO" BELTED VENT SETS
are so widely used.

For efficient low-cost ventilation between 500 cfm and 20,000 cfm (Direct drive Baby Vent Sets for smaller capacities) for easy installation indoors or outdoors — for fans of time-proved performance — you can make no better choice than "Buffalo" Belted Vent Sets. Write for Bulletin 3720 and see why!

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

INDUSTRIAL EXHAUSTERS BELTED VENT SETS PROPELLER FANS "E" BLOWERS-EXHAUSTERS

line to yourself so he may pull you loose in case of accident. (5) Take your time and don't be a fast working "eager beaver."

25. (a) See that you are insulated from the ground, if possible. Get some dry, non-conducting material and knock the line loose or push or pull him away from it. Do not touch his body while he is in contact with the hot line, unless you know you are insulated. If nothing else is available, make a loop of your belt and lasso him.

(b) (1) Start artificial respiration immediately and don't get panicky.

(2) Lay victim in prone position, on stomach. Elbows bent, one hand on the other, head on hands, face to one side. Check mouth and throat for foreign obstructions. Kneel at victim's head on either or both knees.

(3) Place hands, fingers spread, thumbs touching, heels of hands just below a line between armpits.

(4) Apply pressure by rocking forward slowly until arms are vertical, keeping elbows straight.

(5) Release pressure slowly and grasp arms just above the elbows. Continue backward, raising arms until tension is felt for maximum chest expansion. Lower arms to complete cycle.

(6) Repeat cycle as near 12 times per minute as you can. Establish a rhythm by saying to yourself slowly: "Out goes the bad air" (completes the pressure movement); "In goes the good air" (completes the release movement); "One - two - three - four" (completes inactive period). Repeat cycle.

(7) Send for help. Keep patient warm if possible. Give no stimulants without doctor's orders. Don't give up.

Home lighting

(Continued from page 27)

effort to secure the cooperation of portable lamp dealers in stocking and selling lamps for seeing as well as for decorative purposes. Members of the company's home service staff will work with its dealer coordinators in contacting lamp buyers in the stores. The buyers will be told how the company will lend its support to the sale of good lighting by telling the story in the newspapers, on TV, radio and other advertising media. The dealers will be urged to stock the good seeing lamps that their customers will be asking for.

The lighting program will be

directed at reaching all customers, with general promotions relating not only to the new home market, but to the existing market as well. Considerable effort, however, will be devoted to building an appreciation of lighting in the new home market.

Cooling demonstration

(Continued from page 28)

winter for about $125 for the year. Actually, these figures are often conservative.

Even though a demonstration of a heat pump does not produce an immediate sale, Gilmore feels that every such demonstration is the spade work for a sale which may germinate at any time in the future.

"Almost every home owner has heard something of the heat pumps and its facilities for extracting comfortably warmed air from the ground," he said, "for this reason, we label the trailer prominently with the fact that it is carrying a heat pump demonstration unit and wherever it is parked it is a certainty that several neighbors, adjoining businessmen, etc., will make a beeline to the installation to ask questions. Often, our salesmen have picked up four or five additional installations at each point where a prospect demonstration was being made."

The heat pump unit, as well as the air conditioner normally carried, are enclosed in acetate paneling to permit the prospective customer to watch the pump, control mechanism, blower, etc., operate.

Mr. Gilmore estimates that the trailer has repaid its costs during two seasons of use, and that because of its dramatic value in driving home the message, it will continue to be his "best salesman" for many years to come.

Mediation Board

(Continued from page 32)

inal contractor is definitely off our approved list for good. Reputable outfits in the industry won't have anything to do with him."

Actually, few cases are heard by the full board. Initially, when a complaint comes in Daste goes out to investigate, examine the work, and see both parties. In the majority of cases, he is able to work out an equitable settlement on the spot.

Activities of the Mediation Board are financed two-thirds by the Federal Government, one-third by the City of New Orleans. It is presently on an experimental basis. "But results have been so good that none of us have any doubt but that it will become a permanent thing," says Colonel Shelton P. Hubbard, chief of the city Housing Improvement and Slum Prevention Division.

Know the law

(Continued from page 27)

enable him to testify positively to a fact which otherwise he could not do.

In that case the facts were that an electrical contractor agreed with a general contractor to install the electrical work in a motel for $24,000. Progress payments were to be made on the basis of 80 per cent monthly estimates.

Necessity for proof

When the general contractor wrongfully terminated the con-

...just a few stars in
ELLIOTT'S COMPLETE LINE OF FITTINGS

Write For Complete Catalog
ELLIOTT ELECTRIC PRODUCTS CO.
1513 Olmstead Av., New York 62, N. Y.

CLAMP AND LOCK YOUR CONNECTIONS THE K&H WAY

This
SWIVEL U-BOLT CONNECTOR
is designed to do just that...

No Removable Parts
Easily and Speedily Installed
Sturdily Constructed

MEET ALL REQUIREMENTS
83% Copper Alloy • Ample Strength
High Conductivity • Unaffected by Vibration
Moisture Resistant
Sizes Up to 1,000,000 CM.
Approved by Engineers

Specify K&H for YOUR Next Job
For More Details, Sizes and Prices
WRITE FOR CATALOG

KRUEGER & HUDEPOHL, INC.
VINE AT THIRD E. S. CINCINNATI 2, OHIO

tract, $12,226.40 had been paid to the electrical contractor. Because the work had been only partly finished, it became necessary for the electrical contractor to prove how much he had spent on labor and materials, in establishing the amount of damages to which he was entitled. He claimed that he had spent $19,248.69, and that it would have cost about $4,000 to complete the contract and thereby earn the $24,000 contract price. In upholding judgment for $6,722.75, the Court of Appeals decided:

The electrical contractor had a right to produce an itemized list of labor and materials furnished in performing the contract and use it *—not as independent evidence but to refresh his recollection* as to what items were furnished and at what prices. (Dodson Brothers, Builders, v. Adkins, 275 S. W. 2d 143.)

Tool inventory

(Continued from page 21)

When a job is completed, the name is erased from the white-faced plate to serve for future use.

"If someone calls up from a job asking for a 3-inch hole saw for conduit or a ½-inch rope or a 5-inch hydraulic bender, and we do not have one in reserve, we have only to turn to other current jobs and remove the tool from where it is not in use to where it is needed immediately. In the shop we transfer the small tag to the job on which the tool is being sent," explained Mr. Silverberg. "When the tool is returned to stock, the tag is moved over to reserve. If the tool needs cleaning, oiling or repair, the tag stays in the reserve column."

Wiring conference

(Continued from page 25)

capitalize on it and to multiply its effect.

L. E. Barrett, president of the Barrett Electrical Supply Co., of St. Louis, Mo., and president of the National Association of Electrical Distributors, said the campaigns for adequate wiring which are underway for 1956 "are bound to have a dynamic effect on the public." Mr. Barrett outlined the national advertising which will appear under the banner of the National Adequate Wiring Bureau during 1956, stating the manner in which all other national programs for adequate wiring "complement one another and offer to all of us the most effective promotional vehicle the adequate wiring movement has ever had."

The Edison Electric Institute's Housepower campaign was outlined by Edwin O. George, manager of sales, The Detroit Edison Company, and chairman of the Adequate Wiring Promotion Committee of EEI.

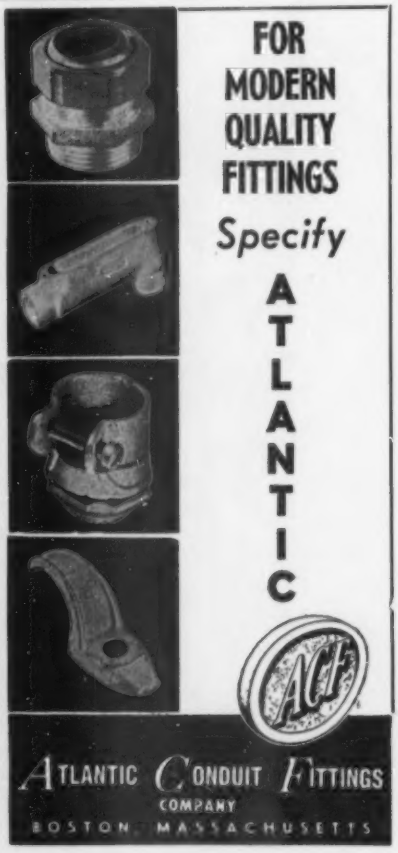
Reports on promotion of adequate wiring by their companies and future plans were outlined by representatives from the Owens-Corning Fiberglas, Kennecott, and Allis-Chalmers.

Look magazine, represented by Frederick Bauer, vice-president, presented trophies as awards for adequate wiring promotion to each electrical industry group represented at the conference, as well as four honorary awards and one special citation.

Textile mill wiring

(Continued from page 23)

ing and fastening work is omitted altogether, both material and labor, this would reduce the cost of the low-voltage distribution on



our hypothetical job by only 3.3%, and the over-all electrical budget by 1.6%.

Job methods are largely determined by the contractor's general superintendent, usually in co-operation with the estimator-engineer, and sometimes with the job supervisor as well. Items to be considered would be the crew size and the degree of skill required, hiring and placing of a crew on the job, material handling and storage, general job housekeeping, and provisions for safety of the workmen and the work.

On jobs where repetitive work occurs, a study would be made of the economics of mass production or pre-fabrication. A labor cost control would be set up, involving progress reports from the job, evaluation of the reports, and follow-up as indicated. No specific cost study has been made of any of the items in this group. As a general statement, the difference between very good and very poor job methods might be equivalent to 1/3 to ½ of the productive manhours estimated for the job. In practice, the difference between two qualified contractors should be minor, and the economic effect negligible.

Tools and special construction equipment are being used more extensively by electrical contractors as the cost of hand labor becomes more and more prohibitive. Our own stock includes air compressors, power saws, power benders, power cable pullers, portable generator, powder tools, welding machines, compression tools for cable connecting, special masonry drills, and portable work benches and rolling scaffolds.

Adequate tooling for a typical textile mill job will cost from $.07 to $.09 per manhour or from 3% to 5% of the productive labor payroll. Through improved efficiency, they may be expected to reduce labor cost by a minimum of $2.00 for each dollar spent.

Good tools also have a salutary effect on the quality of workmanship produced, which in turn will be reflected in trouble-free and low-maintenance installations.

Table 1 also lists the items in this group for which cost data has been prepared, and the data is presented in the accompanying tables.

Table 8—Compression Tool

This study compares the installed cost of standard solderless lugs and parallel connectors with the cost of lugs and connectors which are installed with compression tools. The comparison is based on a compression tool that costs about $175, with dies at $9 per set.

Item	Relative cost						
	2/0	3/0	4/0	250M	350M	500M	750M
Solderless lug	100	100	100	100	100	100	100
Compression lug	61	51	56	53	45	44	48
Parallel connector	100	100	100	100	100	100	100
Compression connector	72	63	60	66	59	56	61

CERTIFIED 45° x 45° SHIELDING FOR SCHOOL LIGHTING

HIGH IN EFFICIENCY 80.5%
HIGHER IN REFLECTANCE 0.93%
HIGHEST IN QUALITY
45296 - 430
Fluorescent by Southern
Here is a fixture not only pleasing to the eye with a 45° x 45° shielding angle, but it has all the qualities of SOUTHERN'S best in design and construction. Can be wired with regular, rapid start, and slimline ballasts. These 2 lite, 4 and 8 foot fixtures are constructed of heavy guage cold rolled steel, designed for either surface (ceiling) or suspension (stem) mounting. The modern designed louvers are securely attached to the "V" type reflector forming one unit, and may be lowered from either side without the use of tools. This SCHOOLITE fixture may be joined in continuous rows without additional parts.
Remember, specify and satisfy with SOUTHERN fluorescent fixtures.
12 - 55

SOUTHERN LIGHTING MFG. CO.
503 ELWELL ST. — ORLANDO, FLORIDA

Specify KNOX WIREHOLDERS

REINFORCED WIREHOLDER

• SAFETY
• DURABILITY
• EASY INSTALLATION

One Piece Pressed Steel Housing All Steel Parts HOT DIP GALVANIZED High QUALITY PORCELAIN Insulator With Smooth Rounded Surfaces.

NO. 5009

KNOX PORCELAIN CORP.
KNOXVILLE 1, TENNESSEE

No. J-559 — 6 Lts. Candelabra Sockets
Width 16"
Min. Length 18" Max. Length 46"

distinctive residential lighting

from the

JAY

LIGHTING COLLECTION

Send for free catalog of complete collection

DEPT. ES4
JAY LIGHTING MFG. CO., INC.
25 Quincy Street Brooklyn 38, New York

ADVERTISER'S INDEX

A

Accurate Mfg. Co. ..... *
Abrams Lighting 90
Advance Transformer Co. .... *
Air Conditioning Products Co. 98
All-Steel Equipment, Inc. .... *
Allis-Chalmers Mfg. Co. 11
American Coolair Corp. 105
American Metal Moulding Co. *
American Steel & Wire Co. U. S. Steel Co. ..... *
American Telephone & Telegraph Co. 73
Anderson Brass Works, Inc. .. *
Appleton Elec. Co. ..... *
Arro Expansion Bolt Co. 97
Arrow-Hart & Hegeman Elec. Co. 78, 79
Atlantic Conduit Fittings Co...102

B

B & C Metal Stamping Co. .. 60
Benjamin Elec. Mfg. Co. .... *
Berns Mfg. Co. ..... *
Blackburn Corp., Jasper ..... *
Blackhawk Industries 100
Briegel Method Tool Co. ...74, 75
Bryant Elec. Co. ..... *
Buffalo Forge Co. 100
Bulldog Elec. Products Co. ... 9
Burndy Engineering Co. 15
Bussman Mfg. Co. ....Back Cover

C

Carol Cable Co., Div. of the Crescent Co., Inc. ..... *
Cavalier Corp. ..... *
Certified Equipment Mfgrs. (Ballasts) 39
Chance Co., A. B. 55
Chelsea Fan & Blower Co. .... *
Circle F. Mfg. Co. ..... *
Classified Ads ..... *
Columbia Cable & Elec. Corp... *
Consolidated General Products, Inc. 61
Cordomatic Div., Vacuum Cleaner Corp. ..... *
Cornish Wire Co. ..... *
Crouse-Hinds Co. ..... *
Curtis Lighting ..... *

D

Day-Brite Lighting, Inc. 85
Diamond Wire & Cable Co. .. *
Distribution Assemblies Department, General Elec. Company 82, 83
Duncan Elec. Mfg. Co. 52

E

Eastern Fixture Co. ..... *
Electric Tube Products ..... *
Electro Compound Co. ..... *
Electromode Corp. 93
Elgo Shutter & Mfg. Co. .... *
Elliot Elec. Products Co. 102
Essex Wire Corp., Paranite Wire & Cable Div. ..... *
Estimating Handbooks Associates 98
Everwarm, Inc. ..... *

F

Fanner Mfg. Co. 77
Fasco Industries, Inc. ..... *
Fast-Lok ..... *
Flourescent Fixtures of California ..... *
Fullman Mfg. Co. 96
Furnas Elec. Co. ..... *

G

Gedney Elec. Co. ..... *
General Cable Corp. 13
General Electric Co. Distribution Assemblies Dept. 82, 83
General Elec. Co., Apparatus Sales Div. 29
General Electric Co., Conduit Standard & Construction Materials Div. ..... *
General Electric Co. (Lamp Div.) 37
General Electric Co., Trumbull Components Depot 67
General Electric Co. Wire & Cable—Construction Materials Div. ..... *
General Electric Co., Wire & Cable—Contractor Market ..... *
General Electric Co., Wiring Devices—Construction Materials Div. ..... *
General Electric Co. Distribution Transformers Dept. ..... *
Gibson Mfg. Co. 42
Globe Lighting Products, Inc... 16
Graybar Elec. Co. ..... *
Guth Company, Edwin F. 7

H

Helwig Company 107
Hindle Transformer Co. 107
Holan Corp., J. H. 38
Hubbard & Co. 5
Hubbell, Inc., Harvey ..... *

I

Ideal Industries, Inc. 99
Ideal-Simplet Fittings, Inc. ... 49
I-T-E Circuit Breaker Co. .... *

J

Jackson Mfg. Co., W. L. 45
Jay Lighting Mfg. Co., Inc. ...104

ADVERTISER'S INDEX

K

Kearney Corp., James R. 54
Keystone Mfg. Co. ..... *
Killark Elec. Co. 95
Knox Porcelain Co. 104
Kreuger & Hudepohl 102
Kuhlman Elec. Co. ..... *

L

Leviton Mfg. Co. ..... *
Light & Power Utilities Corp. 2
Lindemann, A. J. and Hoverson (Subsidiary of Norris Thermador Corp.) .. 71
Litecor, Inc. ..... *

M

M & W Elec. Mfg. Co., Inc. .. *
Marcus Transformer Co., Inc... *
Marviray, Inc. ..... *
Massey, Inc., A. H. ..... *
McCleskey Mfg. Co., Ford ... *
Miller Company The ..... *
Moe Light, Inc. 47
Murray Mfg. Corp. ..... *

N

National Elec. Products Corp. *
National Lighting Bureau ... *
Neo-Ray Products, Inc. 108
Norris Thermador Corp. 71
Nutone, Inc. .....Second Cover

O

O Z Electrical Mfg. Co., Inc. .. *
Orangeburg Mfg. Co., Inc. ... 17

P

Paranite Wire & Cable Div., Essex Wire Corp. ..... *
Pass & Seymour, Inc. ..... *
Perfectlite Co. 51
Petersen Engineering Co. 56
Phelps Dodge Copper Products Corp. 64
Plymouth Rubber Co., Inc. ...101
Porcelain Products, Inc. ..... *
Preformed Line Products Co. 80
Prescolite Mfg. Co. 10
Progress Mfg. Co. 35
Pryne & Co., Inc. 92
Pyle-National Co., The ..... *
Pyramid Instrument Corp. ... *

R

Republic Steel Corp. 41
Revere Elec. Mfg. Co. ..... *
Rome Cable Corp. 43
Royal Elec. Co. ..... *
Russell & Stoll Co. 108

S

Simplet Fittings Div., Ideal Industries 49
Simplex Wire & Cable Co. 33
Smithcraft Lighting Div. .... *
Sorgel Elec. Co. 6
Southern Electrical Corp. ... *
Southern Lighting Mfg. Co. ..103
Southern States Equip. Co. ... *
Southwire Company 1
Spang-Chalfant Div., National Supply Co. ..... *
Sperti Faraday, Inc. ..... *
Square D Co. .....Third Cover
Steber Mfg. Co. ..... *
Steel City Elec. Co. ..... *
Stonco Elec. Products Co. ... *
Sunbeam Lighting Co. 69

T

Tennessee Coal & Iron Div., U. S. Steel Co. 62, 63
Theil Tool & Engineering Co... *
Thermador Elec. Mfg. Co. A Division of Norris Thermador Corp. 71
Thomas & Betts Co. ..... *
Tomic Sales & Engineering Co. *
Trade-Winds Motorfans, Inc... *
Triangle Conduit & Cable Co... *
Trumbull Components Dept. General Elec. Co. 67

U

Union Insulating Co. ..... *
United States Steel Co., American Steel & Wire Div. ..... *
Tennessee Coal & Iron Div. 62, 63

V

Virden Co., John C. 30, 31
Vulcan Elec. Co. 94

W

Wadsworth Elec. Mfg. Co. ... *
Walker Electrical Co. ..... *
Want Ads ..... *
Western Insulated Wire ..... *
Westinghouse Elec. Corp. ..... *
Wheeler Reflector Co. 89
Wincharger Corp. 91
Wiremold Co. .....Front Cover

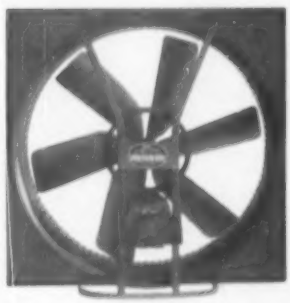
Y

Youngstown Sheet & Tube ... 87

NOW! COOLAIR QUALITY AT COMPETITIVE PRICES!

Budgetair Attic Fan, Type BA, finest in lowest price range. More air at lower, quieter fan speeds. Rubber cushions built into fan frame. Easier to install. Certified ratings. New design shutter, ready to install, no adjustments.

General Purpose Ventilating Fan, Type CQ. Extra-quiet for all types of industrial and commercial jobs where quiet is essential. Exclusive vibration-isolators built in. High efficiency at low static pressures.



2 NEW COOLAIR FANS!

Greater Efficiency — Low Prices!

Coolair fans have been long acknowledged as the quality line in the industry. Now new design, engineering and production methods bring traditional Coolair quality to you at prices that fit the job—no matter how tight the budget.

Here's proof of competitive prices—Coolair fans were used on all four U. S. 3rd Army barracks rehabilitation projects started in the summer of 1955, plus many others!

THE AMERICAN COOLAIR CORPORATION
Jacksonville 3, Florida

Coolair

AMERICAN COOLAIR CORP., 3608 Mayflower Street, Jacksonville 3, Florida

We are interested in Coolair fans for ( ) commercial, ( ) industrial, ( ) residential or _____ jobs.
(list other)

NAME _____

FIRM _____

STREET NO. _____

CITY _____ ZONE _____ STATE _____

MANUFACTURERS' AGENTS

REPRESENTING OUR ADVERTISERS

This listing of Manufacturers' Agents is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. However, no allowance can be made for errors, or for failure to insert. We will appreciate your calling to our attention any corrections or omissions promptly. Only manufacturers' agents are listed here.

ALABAMA

Birmingham

Chapman & Co., Cary
Plymouth Rubber Co.....101
Fuller, James B.
Edwin F. Guth, Co..... 7
Gearhart Co.
Duncan Elec. Mfg. Co. .. 52
Hallmark, D. G.
Day-Brite Lighting, Inc. .. 85
Howarth Co., Inc., J. L.
Fanner Mfg. Co. 77
Richey, Elwyn B.
Wheeler Reflector Co..... 89

Roanoke

Nelson, Walter F.
Gibson Mfg. Co..... 42

ARKANSAS

Little Rock

Brown, J. L.
Buffalo Forge Co.....100
Bryant, Henry
Killark Elec. Mfg. Co.... 95
Nichols, N. B.
Light & Power Utilities
Corp. 2
Stout & Co., Curtis H.
Burndy Engineering Co... 15
Preformed Line Products. 80
Taylor, Harding L.
Orangeburg Mfg. Co., Inc. 17

Pine Bluff

Hartman, Melvin
James R. Kearney Corp... 54
Wiese, Fred
James R. Kearney Corp... 54

Siloam Springs

Jones Co., Ralph
W. L. Jackson Mfg. Co... 45

DISTRICT OF COLUMBIA

Washington, D. C.

Bradley Co.
Burndy Engineering Co.. 15
Quick, James P.
Bulldog Elec. Products... 9

FLORIDA

Coral Gables

Akerman J. H.
Briegel Method Tool Co. 74, 75

Ft. Lauderdale

Evans, William T.
Atlantic Conduit Fittings
Co. 102
Yelch, C. L.
Pryne & Co., Inc. 92

Jacksonville

Belcher & Assos.
Preformed Line Products. 80
Ward Engineering Co.
Ideal Industries, Inc..... 99

Kendall

Lott, Furns
Prescolite Mfg. Co. 10

Lake Wales

Carter Agency, John
B & C Metal Stamping Co. 60
James R. Kearney Corp... 54

Mandarin

Crevasse, Joseph N.
Day-Brite Lighting, Inc... 85

Miami

Belcher & Assos., Inc.
Preformed Line Products
Co. 80
Foerster, James A.
Day-Brite Lighting, Inc.. 85
Gearhart Co.
Duncan Elec. Mfg. Co.... 52
Shaw-Hardy Co.
Burndy Engineering Co... 15

Mt. Dora

Hill, Kenneth H.
Blackhawk Industries....100

Orlando

Ward Engineering Co.
Ideal Industries, Inc..... 99

Pine Castle

Myles, Jr., J. F.
Electromode Corp. 93

St. Petersburg

Fulton, Wm. A.
Wheeler Reflector Co. .. 89

GEORGIA

Atlanta

Arnold, Glen H.
Pryne & Co., Inc. 92
Biglin Co., Inc., H. C.
Air Conditioning Products
Co. 98
Wiremold Co....Front Cover
Boyd, Samuel G.
Helwig Co. 107
Chapman & Co., Cary
Fullman Mfg. Co. 96
Plymouth Rubber Co.....101
Gearhart Co.
Duncan Elec. Mfg. Co.... 52
Griffin & Griffin
Abrams Lighting 90
Blackhawk Industries....100
Hinson, Walter M.
B & C Metal Stamping Co. 60
Hopper & McCoy, Inc.
Arro Expansion Bolt Co... 97
Whitman Assos.
Wheeler Reflector Co.... 89
Kennon, W. N.
Atlantic Conduit Fittings
Co. 102
Koeln & C., Geo. R.
Fanner Mfg. Co. 77
Lloyd Co., J. A.
W. L. Jackson Mfg. Co... 45
Loyd, Inc., Ernest T.
Killark Elec. Mfg. Co.... 95
Macon, H. L.
Preformed Line Products 80
Milner & Co., W. J.
Light & Power Utilities
Corp. 2
Perfeclite Co. 51
Nash, Walter S.
Briegel Method Tool
Co. 74, 75
Nelson Sales Agency, W. F.
Gibson Mfg. Co. 42
Neo-Ray Products, Inc...108
Ruff & Cannon
Day-Brite Lighting, Inc... 85
Sessoms, Jr., Perry
Electromode Corp. 93
Underwood Co., John L.
American Coolair Corp...105
Woodyard, Charles L.
Prescolite Mfg. Co..... 10

Avondale Estates

Bishop, Wm. F.
Elliot Elec. Products Co..102

Decatur

Kuzell, R. J.
Southern Lighting Mfg.
Co. 103

Rossville

Ledford, L. O.
W. L. Jackson Mfg. Co... 45

KANSAS

Wichita

Zimmerman, Sales Agency,
Helwig Co. 107

KENTUCKY

Lexington

Jobert & Assos.
Wheeler Reflector Co. 89

Louisville

Chick & Co., L. P.
Southwire Co. 1
Esterle, Richard
Killark Elec. Mfg. Co.... 95
Grimes, Gene
Killark Elec. Mfg. Co.... 95
Weyhing, Louis
Light & Power Utilities
Corp. 2

LOUISIANA

Baton Rouge

Gregory-Salisbury Co.
Ideal Industries, Inc. 99

Metairie

Hauk, R. C.
Fanner Mfg. Co. 77

New Orleans

Bagur, Pierre
Neo-Ray Products, Inc. ..108
Baldridge Co. Fred C.
Elliot Elec. Products Co...102
Chapman & Co., Cary
Fullman Mfg. Co. 96
Plymouth Rubber Co. 101
Colcock, Hutson
Wheeler Reflector Co. ... 89
Gregory-Salisbury Co.
Edwin F. Guth Co..... 7
Pryne & Co., Inc. 92
Gulf Sales Agency
Duncan Elec. Mfg. Co... 52
Hagan Co., E. J.
B & C Metal Stamping Co. 60
Prescolite Mfg. Co. 10
Russell & Stoll 108
Hamrick, J. Fred
Sorgel Elec. Co. 6
Hogan, Jr., Paul
Day-Brite Lighting, Inc... 85
Jones-Philibert & Co.
Gibson Mfg. Co. 42
Laubersheimer, Jr., R. J.
Perfeclite Co. 51
Levin & Assos., Al
Briegel Method Tool
Co. 74, 75
Ramond Co., Chas. K.
Atlantic Conduit Fittings
Co. 102
Light & Power Utilities
Corp. 2
Rivera, M. Morin
Ideal-Simplet Fittings, Inc. 49
Stout & Co., Curtis H.
Burndy Engineering Co... 15
Preformed Line Products 80
Titherington, R. G.
Vulcan Elec. Co. 94
Wheatley, W. W.
Killark Elec. Mfg. Co... 95

MARYLAND

Baltimore

Auer, Robert P.
Fullman Mfg. Co. 96
Bailey, Jr., T. H.
Prescolite Mfg. Co. 10
Barrington Assos.
Blackhawk Industries .. 100
Esposito, C. E.
Wheeler Reflector Co.... 89
Masland, Sam
Day-Brite Lighting, Inc.. 85
McCourt, Leo T.
Killark Elec. Mfg. Co.... 95

Silver Springs

Hover, Ernest
Duncan Elec. Mfg. Co. 52

Towson

Clements, Geo.
Elliot Elec. Products Co. 102

MANUFACTURERS' AGENTS
REPRESENTING OUR ADVERTISERS

This listing of Manufacturers' Agents is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. However, no allowance can be made for errors, or for failure to insert. We will appreciate your calling to our attention any corrections or omissions promptly. Only manufacturers' agents are listed here.

MISSISSIPPI

Jackson

Gregory-Salisbury Co.
Edwin F. Guth Co..... 7
Pryne & Co., Inc. 92

MISSOURI

Clayton

Noser, Joseph A.
Prescolite Mfg. Corp..... 10

Kansas City

Anderson Co., Robert
Gibson Mfg. Co. 42
Neo-Ray Products, Inc...108
Fleming & Co.
Fullman Mfg. Co. 96
Gaines Company
Wheeler Reflector Co. 89
Grant John
Knox Porcelain 104
Southwire Co. 1
Roes & Co., H. A.
Day-Brite Lighting, Inc... 85
Stover-Andrews Co.
Perfeclite Co. 5
Terry Organizations, Inc., Wm. B.
Killark Elec. Mfg. Co.... 95
Thorsell, Carl
Prescolite Mfg. Co. 10
Ward Co., Charles L.
Burndy Engineering Co... 15
Fanner Mfg. Co..... 77
Wendegatz, L. G.
Preformed Line Products 80

Springfield

Boggs & Co., Ivan
Fanner Mfg. Co. 77

St. Louis

Andrews Co., Harry C.
Briegel Method Tool Co. 74, 75
Bullivant, F. J.
Helwig Co. 107
Cleary, M. J.
Atlantic Conduit Fittings Co. 102
Erwin Assos., P. M.
Wheeler Reflector Co. .. 89
Hagen & Co., Gene
Gibson Mfg. Co. 42
Walter, F. P.
Fullman Mfg. Co. 96

Webster Groves

Hinchman, R. F.
Killark Elec. Mfg. Co.... 95

NORTH CAROLINA

Charlotte

Bagby Co., S. L.
Electromode Corp. 93
Gearhart Co.
Duncan Elec. Mfg. Co... 52
Glenn & Larson Co.
Burndy Engineering Co.. 15
Hilton, A. F
Perfeclite Co. 51
Lloyd Sales Agency, J. A.
W. L. Jackson Mfg. Co... 45
Lombardi Co., E. F.
B & C Metal Stamping Co. 60
Jay Lighting 104
Lumpkin, J. P.
Bulldog Elec. Products .. 9
Marsden, D. A.
Vulcan Elec. Co. 95
Tindal, Norman E.
Wheeler Reflector Co. .. 89
Williams, K. L.
Bulldog Elec. Products.. 9

Greensboro

Chapman & Co., Cary
Fullman Mfg. Co. 96
Plymouth Rubber Co. ...101
Miller, Max I.
Sorgel Elec. Co. 6

Raleigh

Gill, Allen G.
Abrams Lighting 90

OKLAHOMA

Lawton

Cox, C. W.
Southwire Co. 1

Oklahoma City

Cole Co., J. H.
Helwig Co. 107
Comer Sales Co.
Ideal Industries, Inc..... 99
Prag, Elmer
Day-Brite Lighting, Inc... 85
Ward Co., Charles L.
Burndy Engineering Co.. 15
Wilson Co., Floyd
Prescolite Mfg. Co. 10

Tulsa

Anderson Co., C. B.
A. B. Chance Co..... 55
Duncan Elec. Mfg. Co.... 52
Preformed Line Products 80
Peabody Bros.
Wheeler Reflector Co..... 89
Rome Cable Corp. 43
Peterson, V. H.
Bulldog Elec. Products.. 9

SOUTH CAROLINA

Columbia

Engineer Sales Co.
Preformed Line Products. 80
Greene, G. W.
Wheeler Reflector Co..... 89

TENNESSEE

Chattanooga

Graig-Owen
Light & Power Utilities Corp. 2
Electromode Corp. 93

Cut Maintenance and Power Costs with

HINDLE DRY-TYPE TRANSFORMERS

The Modern Transformer for Modern Industry. 80° C. Rise — Class B Insulation. Available in size 25 VA to 200 KVA. One, two or three phase, 600 volts and below. A dependable product, manufactured according to the most advanced scientific methods and backed by 15 years experience in transformer design.

FREE Send for your free copy of our Dry Type catalog. It contains valuable information for the electrical engineer, consulting engineer, architect, contractor and buyer

HINDLE TRANSFORMER CO., INC.
10 WOODS CHURCH RD. FLEMINGTON, N.J.

HINDLE TRANSFORMER COMPANY INC.

It doesn't Cost
It PAYS to use

HELWIG
CARBON BRUSHES

SPEED INSTALLATION
INCREASE BRUSH LIFE
CUT MOTOR DOWN TIME
SLASH MOTOR MAINTENANCE

HELWIG SPEER
HELWIG CO. CARBON PRODUCTS
2536 N. 30th Street
MILWAUKEE 10, WISCONSIN

NEW SUBSCRIPTION ORDER FORM

Use this handy coupon for entering your subscription to

ELECTRICAL SOUTH

W. R. C. Smith Publishing Co.
Department ES-11
806 Peachtree St., N. E.
Atlanta 8, Georgia

☐ New Subscription
☐ Renewal Subscription

You may renew/enter my subscription to ELECTRICAL SOUTH for 3 years.

Name _____

P. O. Box or Street and No. _____

City _____ State _____

Firm _____ Position _____

☐ Enclosed find $2.00 ☐ Send bill for $2.00

Aiming ROTO-STRIP at grazing angles permits easy detection of flaws. It is also ideal for any inspection work since it is so simple to adjust the light anywhere . . . at any angle.

This complete shallow unit (available for surface, corner or recessed mounting) has built-in recessed roto sockets that swing 90° in all directions through a complete 360° circle . . . and stay put at any angle. Available in stock sizes of 2'—3'—5' and 8' lengths.

Kansas • Missouri
Bob Anderson Company
4908 West 72nd St.
Kansas City 15, Mo.

Arkansas • Louisiana
Mississippi • West Tenn.
Pierre E. Bagur, Jr. & Co.
International Trade Mart
New Orleans 12, La.

Texas • Oklahoma
Walter J. Huemmer
Dallas Transfer &
Terminal Warehouse Bldg.
Dallas 2, Texas

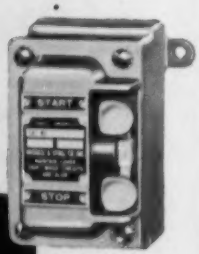
Kentucky
Swan Sales Company
1105 Chestnut St.
Ashland, Ohio

Alabama • Florida
Georgia • N. Carolina
S. Carolina • Virginia
East. Tenn.
Walter F. Nelson
Bona Allen Bldg.
Atlanta 3, Ga.

Illinois • Indiana
W. S. Mitchell
1228 No. Lombard Ave.
Oak Park, Ill.

Mfrd. by: NEO-RAY PRODUCTS, INC., 315 E. 22nd St., New York 10, N. Y.

Announcing **A NEW LINE OF**
R&S
EXPLOSION-PROOF and DUST TIGHT
PUSH BUTTON and SELECTOR SWITCH STATIONS



EFS and HEFS TYPES
For Surface Mounting
(Class I, groups C & D)

EFS 223
HEFS 223

EFS 213
HEFS 213

HEFS W115

EFSIS W116

These new R&S Explosion-Proof and Dust-Tight Standard Duty EFS and Heavy Duty HEFS push button stations are for use in hazardous locations Class 1, Group C and D. They are available in surface mounting types for control circuits of 600 Volts AC maximum. Both lines are available in single and double element stations—all units offered in either button operated or rocker arm actuated mechanisms.

All interiors are interchangeable. Stations can be furnished in multigang or tandem units and in combination with other Russell & Stoll EFS Devices.

. . . Specify R&S Explosion-Proof Equipment—A complete line . . . Your Complete Safeguard.

Write for literature 2156-11

RUSSELL & STOLL COMPANY, INC. • 125 BARCLAY STREET, NEW YORK 7, N.Y.

E4 **RUSSELL & STOLL**

PRECISION-BUILT ELECTRICAL EQUIPMENT — SINCE 1902

MANUFACTURERS' AGENTS
REPRESENTING OUR ADVERTISERS

This listing of Manufacturers' Agents is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. However, no allowance can be made for errors, or for failure to insert. We will appreciate your calling to our attention any corrections or omissions promptly. Only manufacturers' agents are listed here.

Knoxville

Penry, James B.
Fanner Mfg. Co. 77
Beard, Hal P.
Light & Power Utilities Corp. 2

Memphis

Fitts, Lloyd D.
B & C Metal Stamping Co. 60
Gregory-Salisbury & Co.
Pryne & Co., Inc. 92
Southland Sales Agents
Fanner Mfg. Co. 77
Stout & Co., Curtis H.
Burndy Engineering Co... 15

Nashville

Fowler, Joe
Prescolite Mfg. Co. 10
Irvin, John
Light & Power Utilities Corp. 2
Perfeclite Co. 51

Houston

Brenner Elec. Sales
Elliot Elec. Products Co...102
Clinton, Walter L.
Edwin F. Guth Co. 7
Peabody Bros.
Wheeler Reflector Co.... 89
Rome Cable Corp. 43
Reed, N. O.
Day-Brite Lighting, Inc... 85
Robertson Co., Elgin B.
Burndy Engineering Co.. 15
Preformed Line Products. 80
Thornton, E. B.
Light & Power Utilities Corp. 2
Perfeclite Co. 51
Walters Co., Fred
Jay Lighting Mfg. Co., Inc. 104
Wilson Elec. Equip. Co.
Bulldog Elec. Products Co. 9

Lubbock

Norris, Stewart O.
Day-Brite Lighting, Inc.. 85

TEXAS

Dallas

Auchter, H. A.
Day-Brite Lighting, Inc... 85
Galvin Sales Co.
Ideal Industries, Inc..... 99
Hancock Co., John L.
Prescolite Mfg. Corp.... 10
Huemmer, Walter J.
Light & Power Utilities Corp. 2
Neo-Ray Products, Inc...108
Perfeclite Co. 51
Martin Co., J. D.
Atlantic Conduit Fittings Co. 102
Miller Co., Harry A.
B & C Metal Stamping Co. 60
Morgan Co., Jack
Plymouth Rubber Co. ...101
Peabody Bros.
Wheeler Reflector Co.... 89
Rome Cable Corp. 43
Robertson, Elgin B.
Burndy Engineering Co... 15
Preformed Line Products. 80
Robertson & Co., Jim
Fullman Mfg. Co..... 96
Stephens, V. E.
Light & Power Utilities Corp. 2
Perfeclite Co. 51
Tuite, James
Gibson Mfg. Co. 42
Valkus-Kissell Sales Agency
Briegel Method Tool Co. 74, 75
Knox Porcelain Corp.....104
Ward Co., L. B.
Fanner Mfg. Co. 77
Watson, Felix M.
Arro Expansion Bolt Co. 97
Wilber, B. B.
Blackhawk Industries ...100

VIRGINIA

Arlington

Gordon, Roy V.
Perfeclite Co. 51
Russell, Charles
Ideal-Simplet Fittings, Inc. 49

Richmond

Crews, L. J.
Briegel Method Tool Co. 74, 75
Perfeclite Co. 51
Epperson, W. E.
Jay Lighting Mfg. Co., Inc. 104
Ferguson, Lynn W.
Wheeler Reflector Co.... 89
Fishburne, Robert W.
B & C Metal Stamping Co. 60
Lassiter Sales Co., W. H.
Atlantic Conduit Fittings Co. 102
Prescolite Mfg. Co. 10
Mayo, Jr., Paul
Blackhawk Industries ...100
Schoenfeld, J. P.
W. L. Jackson Mfg. Co... 45
Simpson & Son, Paul
Ideal Industries, Inc. ... 99
Ideal-Simplet Fittings, Inc. 49
Turner, Harris
Edwin F. Guth Co. 7

Warwick

Johnson, S. C.
Elliot Elec. Products Co..102

WEST VIRGINIA

Huntington

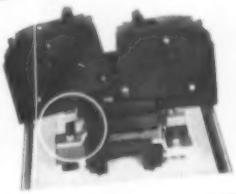
Muller, Harper
Burndy Engineering Co... 15

QO FINEST BREAKER EVER BUILT ...NOW IN LOAD CENTERS!

2 through 42 Circuits

You can't go wrong!

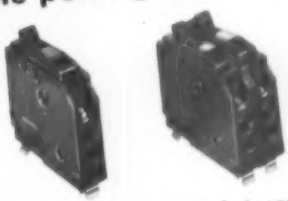
Projections on the insulated barriers prevent installation of wrong amperage breakers unless the barrier is modified. This modification is simple and can be done with a twist of the wrist.



Want to Lock It?

The spring catch can be replaced by a flush panel type lock, shown at left, by simply removing a twist-out. This lock may be "keyed" to match Square D panelboards.

Double poles go anywhere!



Shielded connectors alternate between buses, giving distributed (sequenced) phasing. As a result, two pole common or individual trip breakers can be plugged in anywhere.

• A complete line of load centers for residential, commercial and light industrial applications is already on your Square D distributor's shelf. Available with doors in 12, 20, 30 and 42 circuit basic devices—1 phase, 3 wire; or 3 phase, 4 wire. Lugs only, split bus or main breaker types. Flush, surface and raintight enclosures. UL approved and meets Federal Specifications WP-131A, Class A.

2 through 8 Circuits

For services requiring less circuits, a line of 2, 4, 6 and 8 circuit basic devices, without doors, for 1 phase, 2 wire; or 1 phase, 3 wire. Flush, surface and raintight enclosures. (6 circuit device shown at right)

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

When an

ICE STORM CAUSED SINGLE PHASING

and low voltage conditions . . . we blew a flock of Fusetron fuses but we saved over 40 motors from burn-out.

"For twenty-four hours after the bad ice storm of February 15, 1950 we were endangered by single phasing and low voltage conditions due to the damage done the power lines by the ice.

"During this period, we blew a flock of Fusetron dual-element fuses—around 240 in fact—but we figure that was a very cheap price to pay for saving over 40 motors from burning up.

"After this experience we didn't lose any time in putting all of our plant and equipment under Fusetron Fuse protection."

Michael G. Kupcho.

Master Mechanic
Ashland Shirt and Pajama Company
Ashland, Pennsylvania

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

START SAVING WITH FUSETRON FUSES

One needless shutdown . . . one lost motor . . . one destroyed switch or panel . . . one burned out solenoid . . . may cost you far more than replacing every ordinary fuse with a FUSETRON dual-element fuse now! *Write for bulletin FIS.*

For loads above 600 and up to 5000 amps . . . use BUSS Hi-Cap fuses!

On 600 volts or less, they have unlimited interrupting capacity to handle any fault current. When coordinated with Fusetron fuses they will not open ahead of fuse nearest fault . . . *Write for bulletin HSC.*

BUSSMANN MFG. CO. (Div. of McGraw Electric Co.) St. Louis 7, Mo.